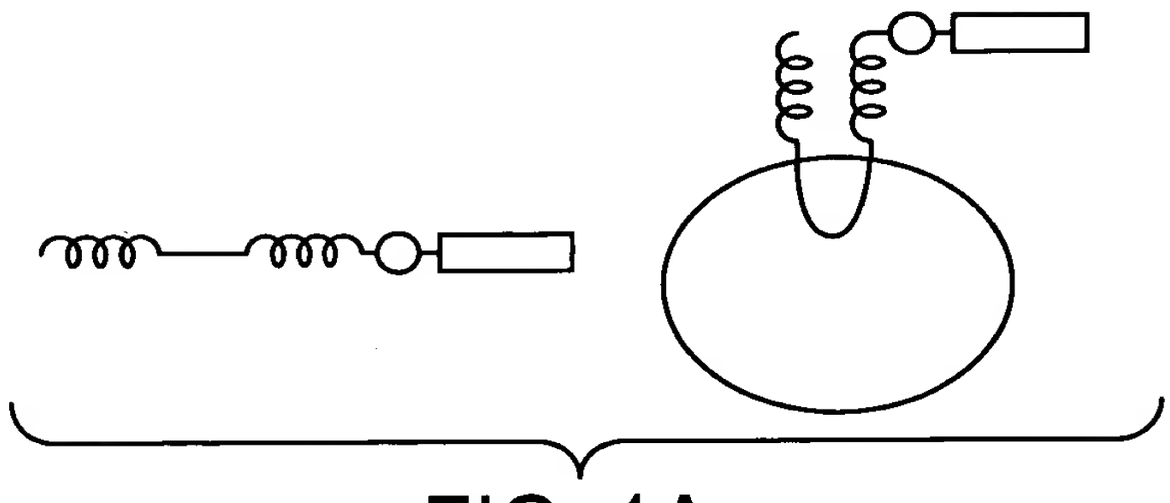

FIG. 1A

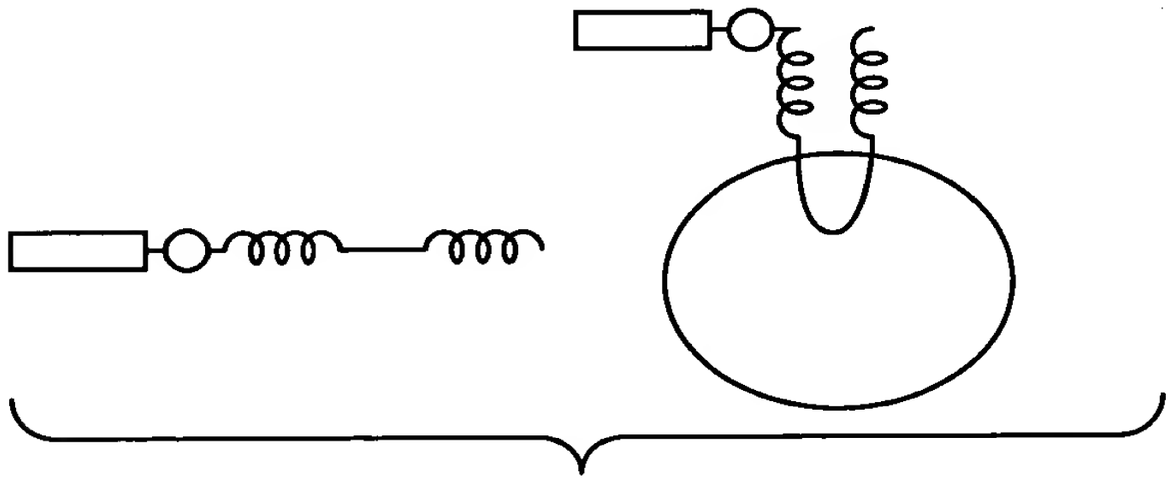

FIG. 1B

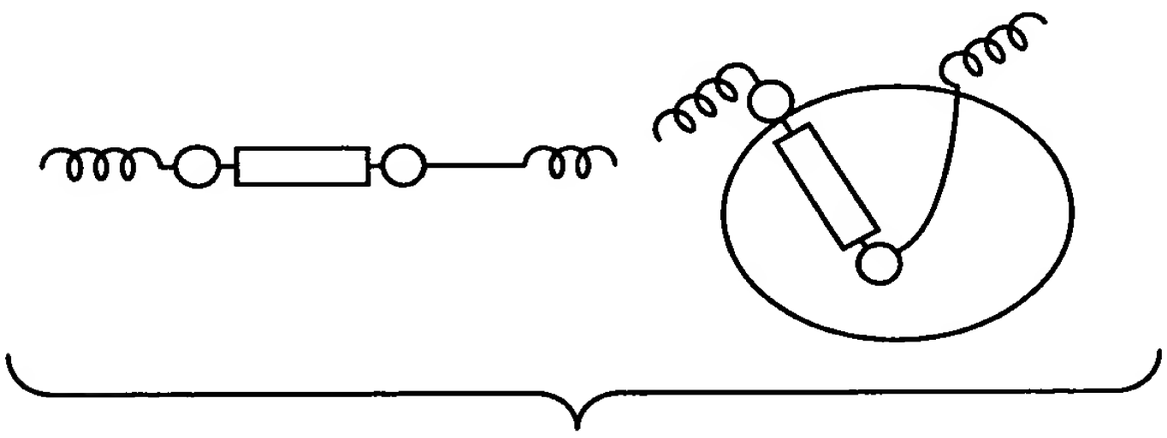

FIG. 1C

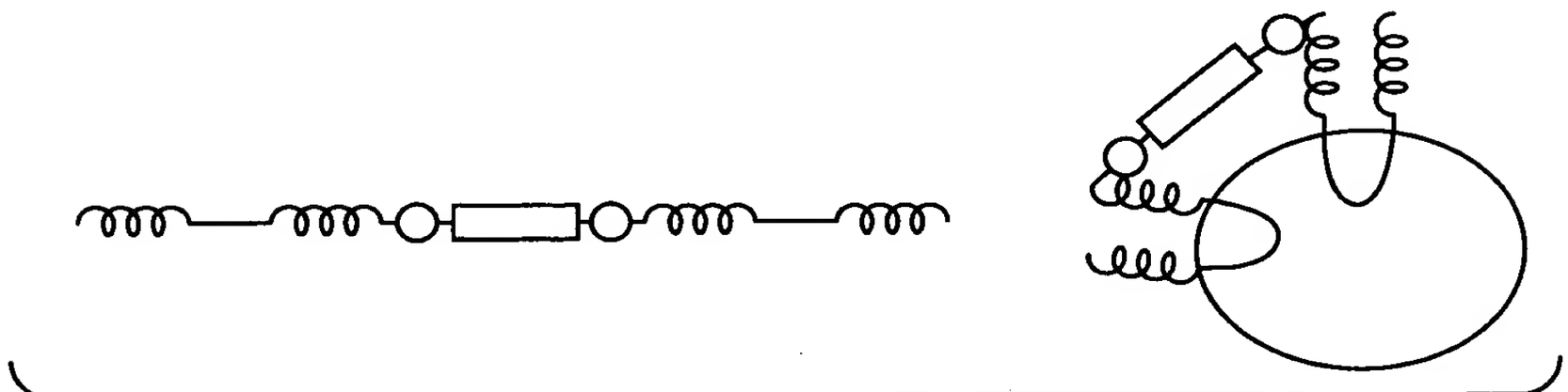

FIG. 1D

NcoI
-867 CCATGGCTATACCCAACCTCGGTCTTGGTCACACCAGGAACTCTCTGGTAAGCTAGCTCCACTCCCCAGAAACAACCGGCGCCAAATTGC

-777 CGGAATTGCTGACCTGAAGACGGAACATCATCGTCGGGTCCTTGGGCGATTGCGGCGGAAGATGGGTCAGCTTGGGCTTGAGGACGAGAC

-687 CCGAATCGAGTCTGTTGAAAGGTTGTTCATTGGGATTTGTATACGGAGATTGGTCGTCGAGAGGTTTGAGGGAAAGGACAAATGGGTTTG
R1

-597 GCTCTGGAGAAAGAGAGTGCGGCTTTAGAGAGAGAATTGAGAGGTTTAGAGAGAGATGCGGCGGCGATGACGGGAGGAGAGACGACGAGG
R2 R2
R1

-507 ACCTGCATTATCAAAGCAGTGACGTGGTGAAATTTGGAACTTTTAAGAGGCAGATAGATTTATTATTTGTATCCATTTTCTTCATTGTTC

-417 TAGAATGTCGCGGAACAAATTTTAAAACTAAATCCTAAATTTTTCTAATTTTGTTGCCAATAGTGGATATGTGGGCCGTATAGAAGGAAT

-327 CTATTGAAGGCCCAAACCCATACTGACGAGCCCAAAGGTTCGTTTTGCGTTTTATGTTTCGGTTCGATGCCAACGCCACATTCTGAGCTA
I

-237 GGCAAAAAACAAACGTGTCTTTGAATAGACTCCTCTCGTTAACACATGCAGCGGCTGCATGGTGACGCCATTAACACGTGGCCTACAATT

-147 GCATGATGTCTCCATTGACACGTGACTTCTCGTCTCCTTTCTTAATATATCTAACAAACACTCCTACCTCTTCCAAAATATATACACATC

M A D T A R G T H H D
-57 TTTTTGATCAATCTCTCATTCAAAATCTCATTCTCTCTAGTAAACAAGAACAAAAAAATGGCGGATACAGCTAGAGGAACCCATCACGAT

I I G R D Q Y P M M G R D R D Q Y Q M S G R G S D Y S K S R
34 ATCATCGGCAGAGACCAGTACCCGATCATGGGCCGAGACCGAGACCAGTACCAGATGTCCGGACGAGGATCTGACTACTCCAAGTCTAGG

Q I A K A A T A V T A G G S L L V L S S L T L V G T V I A L
124 CAGATTGCTAAAGCTGCAACTGCTGTCACAGCTGGTGGTTCCCTCCTTGTTCTCTCCAGCCTTACCCTTGTTGGAACTGTCATAGCTTTG

T V A T P L L V I F S P I L V P A L I T V A L L I T G F L S
214 ACTGTTGCAACACCTCTGCTCGTTATCTTCAGCCCAATCCTTGTCCCGGCTCTCATCACAGTTGCACTCCTCATCACCGGTTTTCTTTCC

S G G F G I A A I T V F S W I Y K
304 TCTGGAGGGTTTGGCATTGCCGCTATAACCGTTTTCTCTTGGATTTACAAgtaagcacacatttatcatcttacttcataattttgtgca

394 atatgtgcatgcatgtgttgagccagtagctttggatcaatttttttggtcgaataacaaatgtaacaataagaaattgcaaattctagg

484 gaacatttggttaactaaatacgaaatttgacctagctagcttgaatgtgtctgtgtatatcatctatataggtaaaatgcttggtatga

Y A T G E H P Q G S D K L D S A R M K L G S K
574 tacctattgattgtgaatagGTACGCAACGGGAGAGCACCCACAGGGATCAGACAAGTTGGACAGTGCAAGGATGAAGTTGGGAAGCAAA

A Q D L K D R A Q Y Y G Q Q H T G G E H D R D R T R G G Q H
664 GCTCAGGATCTGAAAGACAGAGCTCAGTACTACGGACAGCAACATACTGGTGGGGAACATGACCGTGACCGTACTCGTGGTGGCCAGCAC

T T *
754 ACTACTTAAGTTACCCCACTGATGTCATCGTCATAGTCCAATAACTCCAATGTCGGGGAGTTAGTTTATGAGGAATAAAGTGTTTAGAAT

KpnI
844 TTGATCAGGGGGAGATAATAAAAGCCGAGTTTGAATCTTTTTGTTATAAGTAATGTTTATGTGTGTTTCTATATGTTGTCAAATGGTACC

FIG. 2

Title: PREPARATION OF THIOREDOXIN AND THIOREDOXIN REDUCTASE ON OIL BODIES
Inventor(s): Maurice M. MOLONEY et al.
Appl. No.: 09/897,425

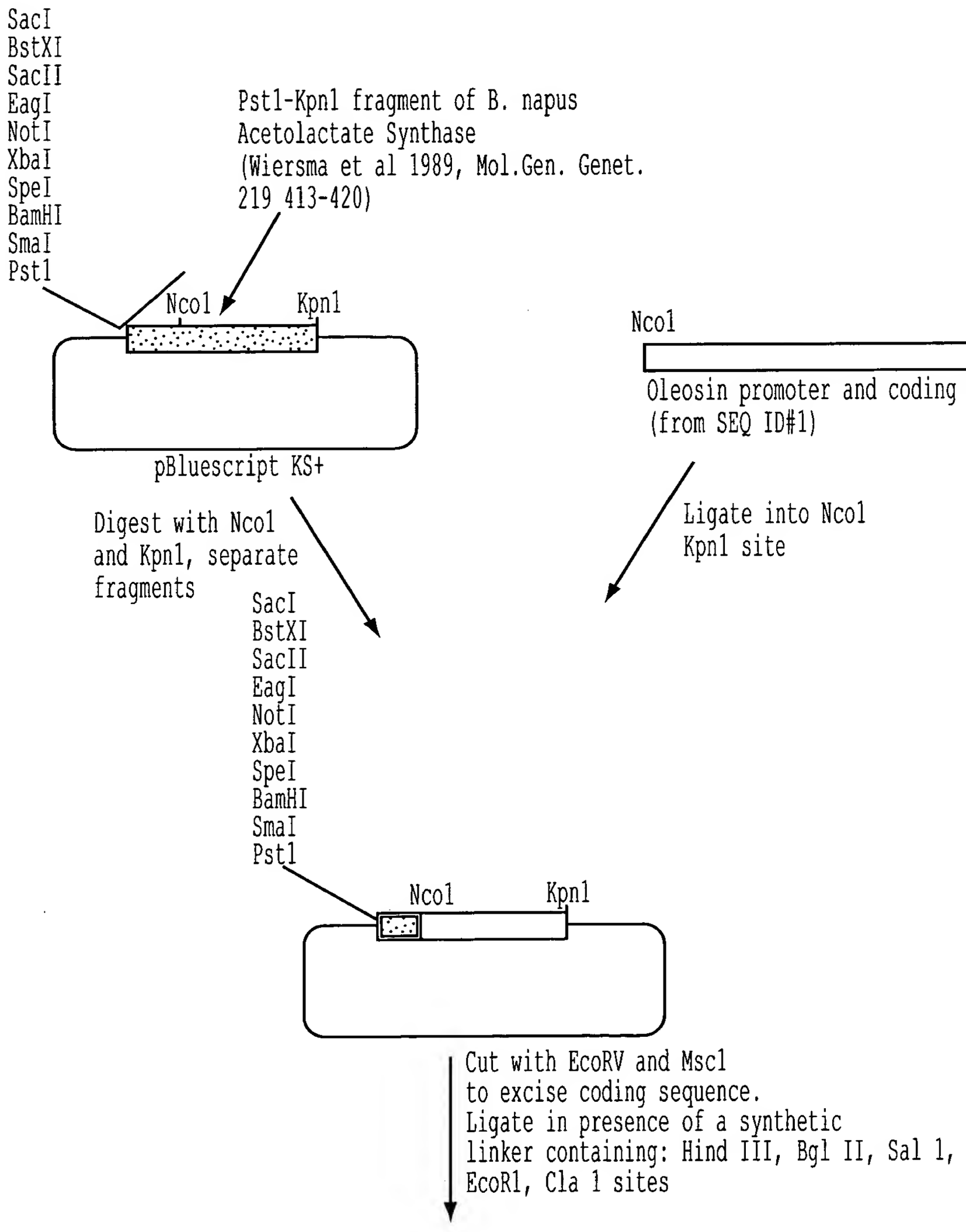

FIG. 3

Title: PREPARATION OF THIOREDOXIN AND THIOREDOXIN REDUCTASE ON OIL BODIES
Inventor(s): Maurice M. MOLONEY et al.
Appl. No.: 09/897,425

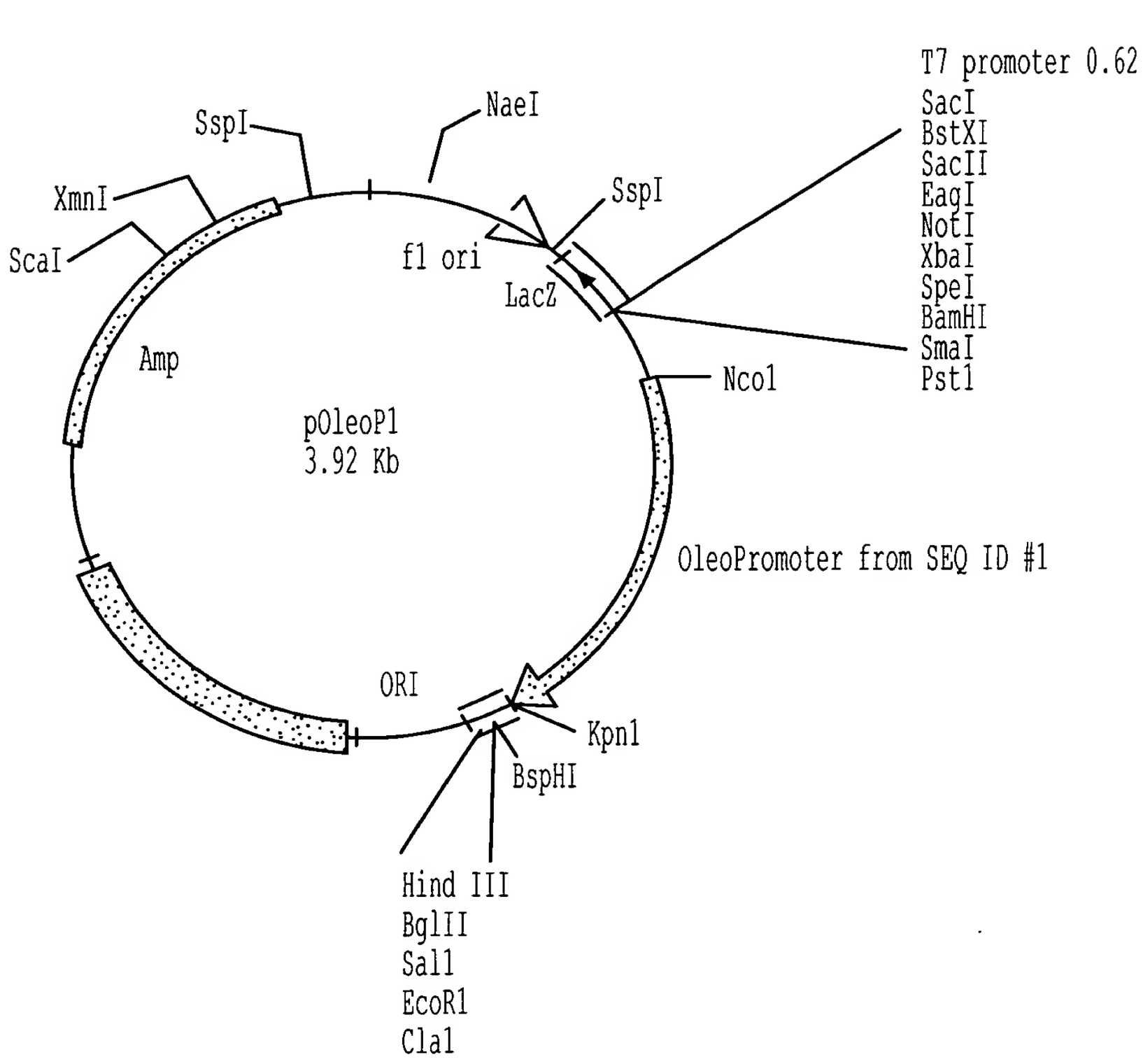

FIG. 3A

```
1   ATG GCG GAT ACA GCT AGA ACC CAT CAC GAT GTC ACA AGT CGA GAT CAG TAT CCC CGA GAC  60
1   M   A   D   T   A   R   T   H   H   D   V   T   S   R   D   Q   Y   P   R   D   20

61  CGA GAC CAG TAT TCT ATG ATC GGT CGA GAC CGT GAC CAG TAC TCT ATG ATG GGC CGA GAC 120
21  R   D   Q   Y   S   M   I   G   R   D   R   D   Q   Y   S   M   M   G   R   D   40

121 CGA GAC CAG TAC AAC ATG TAT GGT CGA GAC TAC TCC AAG TCT AGA CAG ATT GCT AAG GCT 180
41  R   D   Q   Y   N   M   Y   G   R   D   Y   S   K   S   R   Q   I   A   K   A   60

181 GTT ACC GCA GTC ACG GCG GGT GGG TCC CTC CTT GTC CTC TCC AGT CTC ACC CTT GTT GGT 240
61  V   T   A   V   T   A   G   G   S   L   L   V   L   S   S   L   T   L   V   G   80

241 ACT GTC ATT GCT TTG ACT GTT GCC ACT CCA CTC CTC GTT ATC TTT AGC CCA ATC CTC GTG 300
81  T   V   I   A   L   T   V   A   T   P   L   L   V   I   F   S   P   I   L   V   100

301 CCG GCT CTC ATC ACC GTA GCA CTT CTC ATC ACT GGC TTT CTC TCC TCT GGT GGG TTT GCC 360
101 P   A   L   I   T   V   A   L   L   I   T   G   F   L   S   S   G   G   F   A   120

361 ATT GCA GCT ATA ACC GTC TTC TCC TGG ATC TAT AAG TAC GCA ACG GGA GAG CAC CCA CAG 420
121 I   A   A   I   T   V   F   S   W   I   Y   K   Y   A   T   G   E   H   P   Q   140

421 GGG TCA GAT AAG TTG GAC AGT GCA AGG ATG AAG CTG GGA ACC AAA GCT CAG GAT ATT AAA 480
141 G   S   D   K   L   D   S   A   R   M   K   L   G   T   K   A   Q   D   I   K   160

481 GAC AGA GCT CAA TAC TAC GGA CAG CAA CAT ACA GGT GGT GAG CAT GAC CGT GAC CGT ACT 540
161 D   R   A   Q   Y   Y   G   Q   Q   H   T   G   G   E   H   D   R   D   R   T   180

541 CGT GGT GGC CAG CAC ACT ACT TAA                                               564
181 R   G   G   Q   H   T   T   *                                                   188
```

FIG. 4

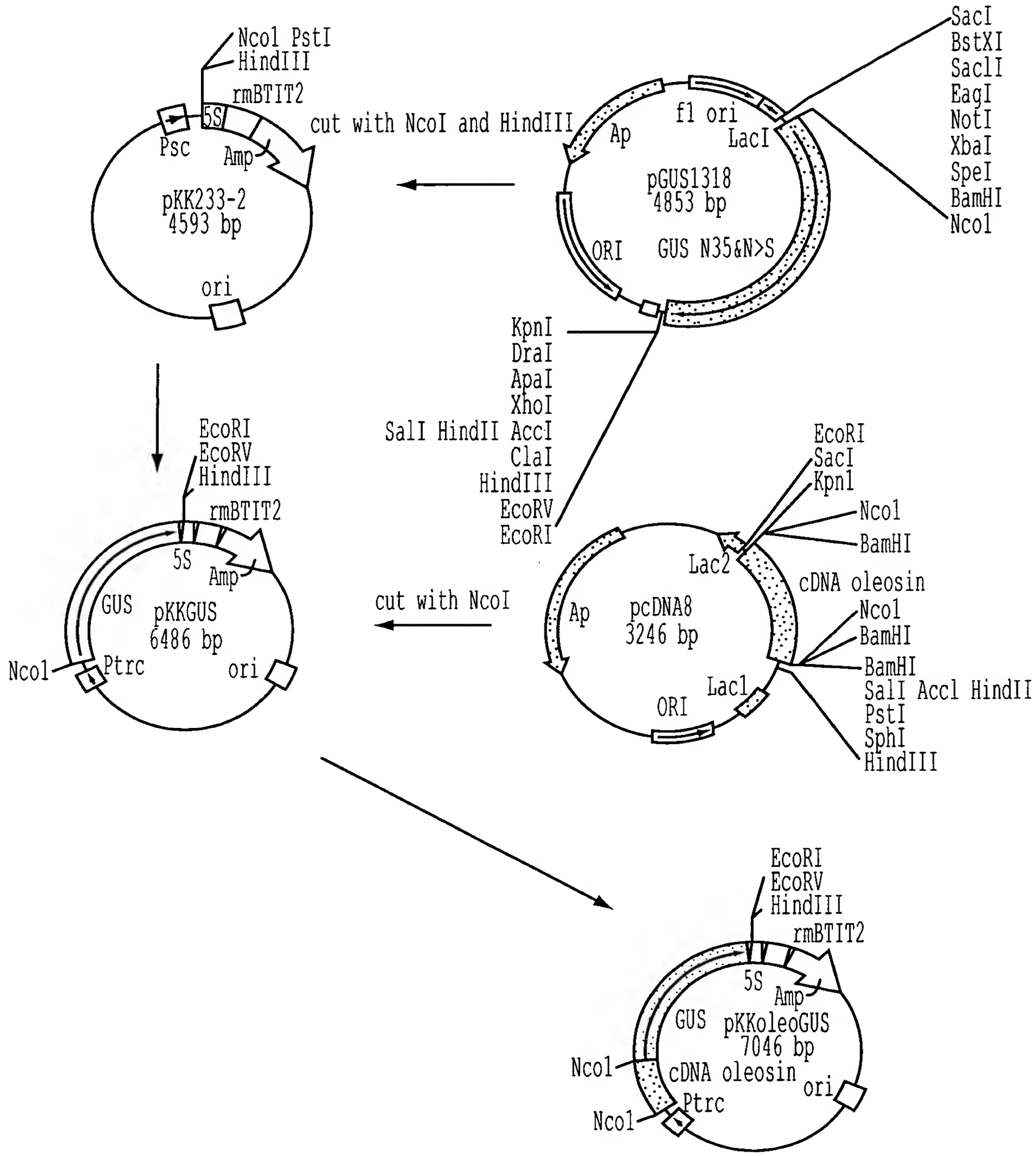

FIG. 5

Title: PREPARATION OF THIOREDOXIN AND THIOREDOXIN REDUCTASE ON OIL BODIES
Inventor(s): Maurice M. MOLONEY et al.
Appl. No.: 09/897,425

HindIII

```
     1  ATAAGCTTGCATGCCTGCGGAACTCTCTGGTAAGCTAGCTCCACTCCCCAGAAACAACCG   60
    61  GCGCCAAATTGCCGGAATTGCTGACCTGAAGACGGAACATCATCGTCGGGTCCTTGGGCG  120
   121  ATTGCGGCGGAAGATGGGTCAGCTTGGGCTTGAGGACGAGACCCGAATCGAGTCTGTTGA  180
   181  AAGGTTGTTCATTGGGATTTGTATACGGAGATTGGTCGTCGAGAGGTTTGAGGGAAAGGA  240
   241  CAAATGGGTTTGGCTCTGGAGAAAGAGAGTGCGGCTTTAGAGAGAGAATTGAGAGGTTTA  300
   301  GAGAGAGATGCGGCGGCGATGACGGGAGGAGAGACGACGAGGACCTGCATTATCAAAGCA  360
   361  GTGACGTGGTGAAATTTGGAACTTTTAAGAGGCAGATAGATTTATTATTTGTATCCATTT  420
   421  TCTTCATTGTTCTAGAATGTCGCGGAACAAATTTTAAAAGTAAATGGTAAATTTTTCTAA  480
   481  TTTTGTTGCCAATAGTGGATATGTGGGCCGTATAGAAGGAATCTATTGAAGGCCCAAACC  540
   541  CATACTGACGAGCCCAAAGGTTCGTTTTGCGTTTTATGTTTCGGTTCGATGCCAACGCCA  600
   601  CATTCTGAGCTAGGCAAAAAACAAACGTGTCTTTGAATAGACTCCTCTCGTTAACACATG  660
   661  CAGCGGCTGCATGGTGACGCCATTAACACGTGGCCTACAATTGCATGATGTCTCCATTGA  720
   721  CACGTGACTTCTCGTCTCCTTTCTTAATATATCTAACAAACACTCCTACCTCTTCCAAAA  780
   781  TATATACACATCTTTTTGATCAATCTCTCATTCAAAATCTCATTCTCTCTAGTAAACAAG  840
                M  A  D  T  A  R  G  T  H  H  D  I  I  G  R  D  Q
   841  AACAAAAAAAATGGCGGATACAGCTAGAGGAACCCATCACGATATCATCGGCAGAGACCAG  900
         Y  P  M  M  G  R  D  R  D  Q  Y  Q  M  S  G  R  G  S  D  Y
   901  TACCCGATGATGGGCCGAGACCGAGACCAGTACCAGATGTCCGGACGAGGATCTGACTAC  960
         S  K  S  R  Q  I  A  K  A  A  T  A  V  T  A  G  G  S  L  L
   961  TCCAAGTCTAGGCAGATTGCTAAAGCTGCAACTGCTGTCACAGCTGGTGGTTCCCTCCTT 1020
         V  L  S  S  L  T  L  V  G  T  V  I  A  L  T  V  A  T  P  L
  1021  GTTCTCTCCAGCCTTACCCTTGTTGGAACTGTCATAGCTTTGACTGTTGCAACACCTCTG 1080
         L  V  I  F  S  P  I  L  V  P  A  L  I  T  V  A  L  L  I  T
  1081  CTCGTTATCTTCAGCCCAATCCTTGTCCCGGCTCTCATCACAGTTGCACTCCTCATCACC 1140
         G  F  L  S  S  G  G  F  G  I  A  A  I  T  V  F  S  W  I  Y
  1141  GGTTTTCTTTCCTCTGGAGGGTTTGGCATTGCCGCTATAACCGTTTTCTCTTGGATTTAC 1200
         K
  1201  AAGTAAGCACACATTTATCATCTTACTTCATAATTTTGTGCAATATGTGCATGCATGTGT 1260
  1261  TGAGCCAGTAGCTTTGGATCAATTTTTTTGGTCGAATAACAAATGTAACAATAAGAAATT 1320
  1321  GCAAATTCTAGGGAACATTTGGTTAACTAAATACGAAATTTGACCTAGCTAGCTTGAATG 1380
  1381  TGTCTGTGTATATCATCTATATAGGTAAAATGCTTGGTATGATACCTATTGATTGTGAAT 1440
         Y  A  T  G  E  H  P  Q  G  S  D  K  L  D  S  A  R  M  K
  1441  AGGTACGCAACGGGAGAGCACCCACAGGGATCAGACAAGTTGGACAGTGCAAGGATGAAG 1500
         L  G  S  K  A  Q  D  L  K  D  R  A  Q  Y  Y  G  Q  Q  H  T
  1501  TTGGGAAGCAAAGCTCAGGATCTGAAAGACAGAGCTCAGTACTACGGACAGCAACATACT 1560
         G  G  E  H  D  R  D  R  T  R  G  G  Q  H  T  T  L  V  P  R
  1561  GGTGGGGAACATGACCGTGACCGTACTCGTGGTGGCCAGCACACTACTCTCGTTCCACGA 1620
         G  S  M  A  E  I  T  R  I  P  L  Y  K  G  K  S  L  R  K  A
  1621  GGATCCATGGCTGAGATCACCAGGATGGGTCTGTACAAAGGCAAGTCTCTGAGGAAGGCG 1680
         L  K  E  H  G  L  L  E  D  F  L  Q  K  Q  Q  Y  G  I  S  S
  1681  CTGAAGGAGCATGGGCTTCTGGAGGACTTCCTGCAGAAACAGCAGTATGGCATCAGCAGC 1740
         K  Y  S  G  F  G  E  V  A  S  V  P  L  T  N  Y  L  D  S  Q
  1742  AAGTACTCCGGCTTCGGGGAGGTGGCCAGCGTGCCCCTGACCAACTACCTGGATAGTCAG 1800
```

FIG. 6

```
          Y  F  G  K  I  Y  L  G  T  P  P  Q  E  F  T  V  L  F  D  T
1801  TACTTTGGGAAGATCTACCTCGGGACCCCGCCCCAGGAGTTCACCGTGCTGTTTGACACT 1860
          G  S  S  D  F  W  V  P  S  I  Y  C  K  S  N  A  C  K  N  H
1861  GGCTCCTCTGACTTCTGGGTACCCTCTATCTACTGCAAGAGCAATGCCTGCAAAAACCAC 1920
          Q  R  F  D  P  R  K  S  S  T  F  Q  N  L  G  K  P  L  S  I
1921  CAGCGCTTCGACCCGAGAAAGTCGTCCACCTTCCAGAACCTGGGCAAGCCCCTGTCTATC 1980
          H  Y  G  T  G  S  M  Q  G  I  L  G  Y  D  T  V  T  V  S  N
1981  CACTACGGGACAGGCAGCATGCAGGGCATCCTGGGCTATGACACCGTCACTGTCTCCAAC 2040
          I  V  D  I  Q  Q  T  V  G  L  S  T  Q  E  P  G  D  V  F  T
2041  ATTGTGGACATCCAGCAGACAGTAGGCCTGAGCACCCAGGAGCCCGGGGACGTCTTCACC 2100
          Y  A  E  F  D  G  I  L  G  M  A  Y  P  S  L  A  S  E  Y  S
2101  TATGCCGAATTCGACGGGATCCTGGGGATGGCCTACCCCTCGCTCGCCTCAGAGTACTCG 2160
          I  P  V  F  D  N  M  M  N  R  H  L  V  A  Q  D  L  F  S  V
2161  ATACCCGTGTTTGACAACATGATGAACAGGCACCTGGTGGCCCAAGACCTGTTCTCGGTT 2220
          Y  M  D  R  N  G  Q  E  S  M  L  T  L  G  A  I  D  P  S  Y
2221  TACACAGGGTCCCTGCACTGGGTGCCCGTGACAGTGCAGCAGTACTGGCAGTTCACTGTG 2280
          Y  T  G  S  L  H  W  V  P  V  T  V  Q  Q  Y  W  Q  F  T  V
2281  GACAGTGTCACCATCAGCGGTGTGGTTGTGGCCTGTGAGGGTGGCTGTCAGGCCATCTTG 2340
          D  S  V  T  I  S  G  V  V  V  A  C  E  G  G  C  Q  A  I  L
2341  GACAGTGTCACCATCAGCGGTGTGGTTGTGGCCTGTGAGGGTGGCTGTCAGGCCATCTTG 2400
          D  T  G  T  S  K  L  V  G  P  S  S  D  I  L  N  I  Q  Q  A
2401  GACACGGGCACCTCCAAGCTGGTCGGGCCCAGCAGCGACATCCTCAACATCCAGCAGGCC 2460
          I  G  A  T  Q  N  Q  Y  G  E  F  D  I  D  C  D  N  L  S  Y
2461  ATTGGAGCCACACAGAACCAGTACGGTGAGTTTGACATCGACTGCGACAACCTGAGCTAC 2520
          M  P  T  V  V  F  E  I  N  G  K  M  Y  P  L  T  P  S  A  Y
2521  ATGCCCACTGTGGTCTTTGAGATCAATGGCAAAATGTACCCACTGACCCCCTCCGCCTAT 2580
          T  S  Q  D  Q  G  F  C  T  S  G  F  Q  S  E  N  H  S  Q  K
2581  ACCAGCCAAGACCAGGGCTTCTGTACCAGTGGCTTCCAGAGTGAAAATCATTCCCAGAAA 2640
          W  I  L  G  D  V  F  I  R  E  Y  Y  S  V  F  D  R  A  N  N
2641  TGGATCCTGGGGGATGTTTTCATCCGAGAGTATTACAGCGTCTTTGACAGGGCCAACAAC 2700
          L  V  G  L  A  K  A  I  *
2701  CTCGTGGGGCTGGCCAAAGCCATCTGAAAGCTT                             2733
                                  HindIII
```

FIG. 6A

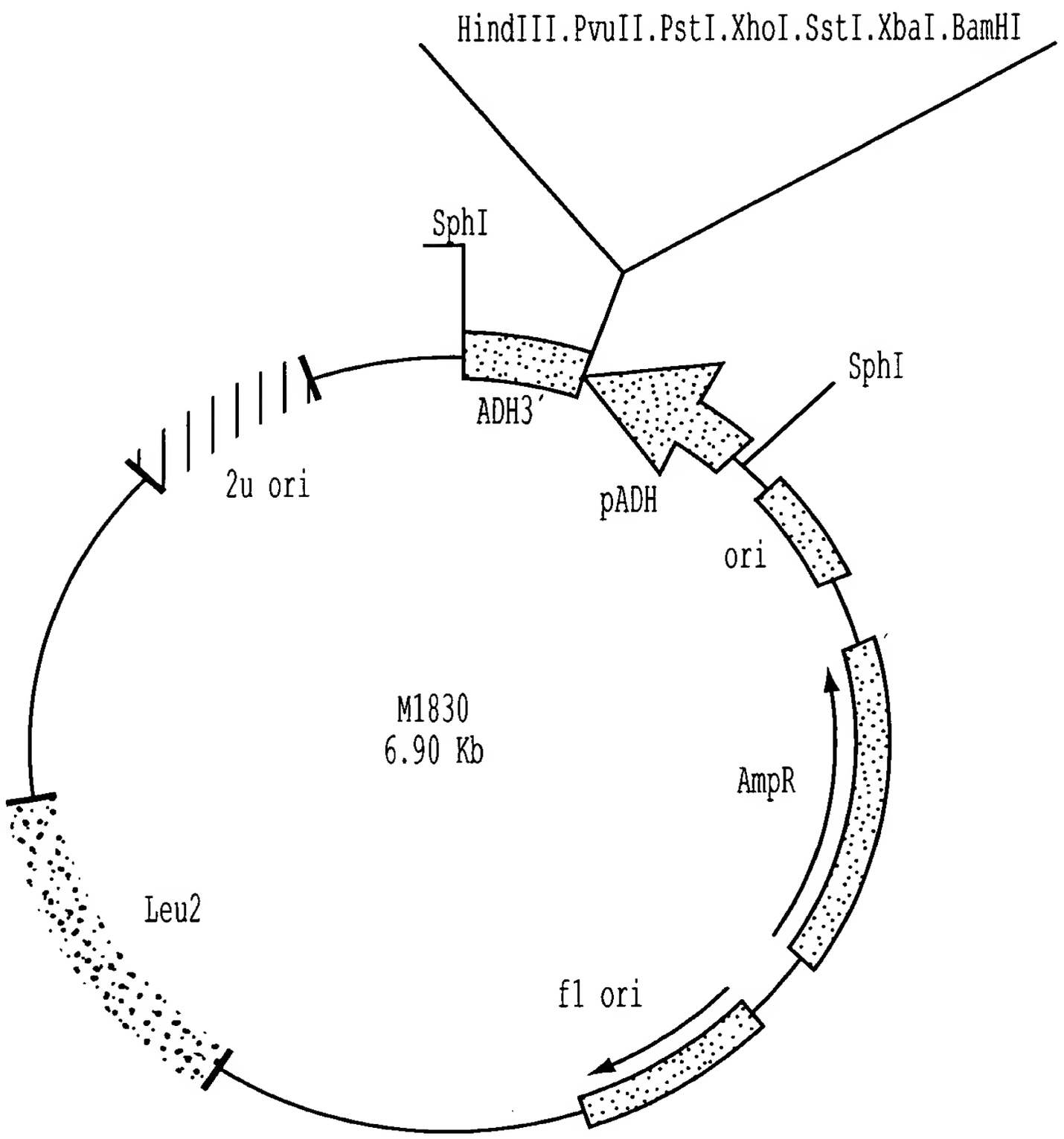

FIG. 7

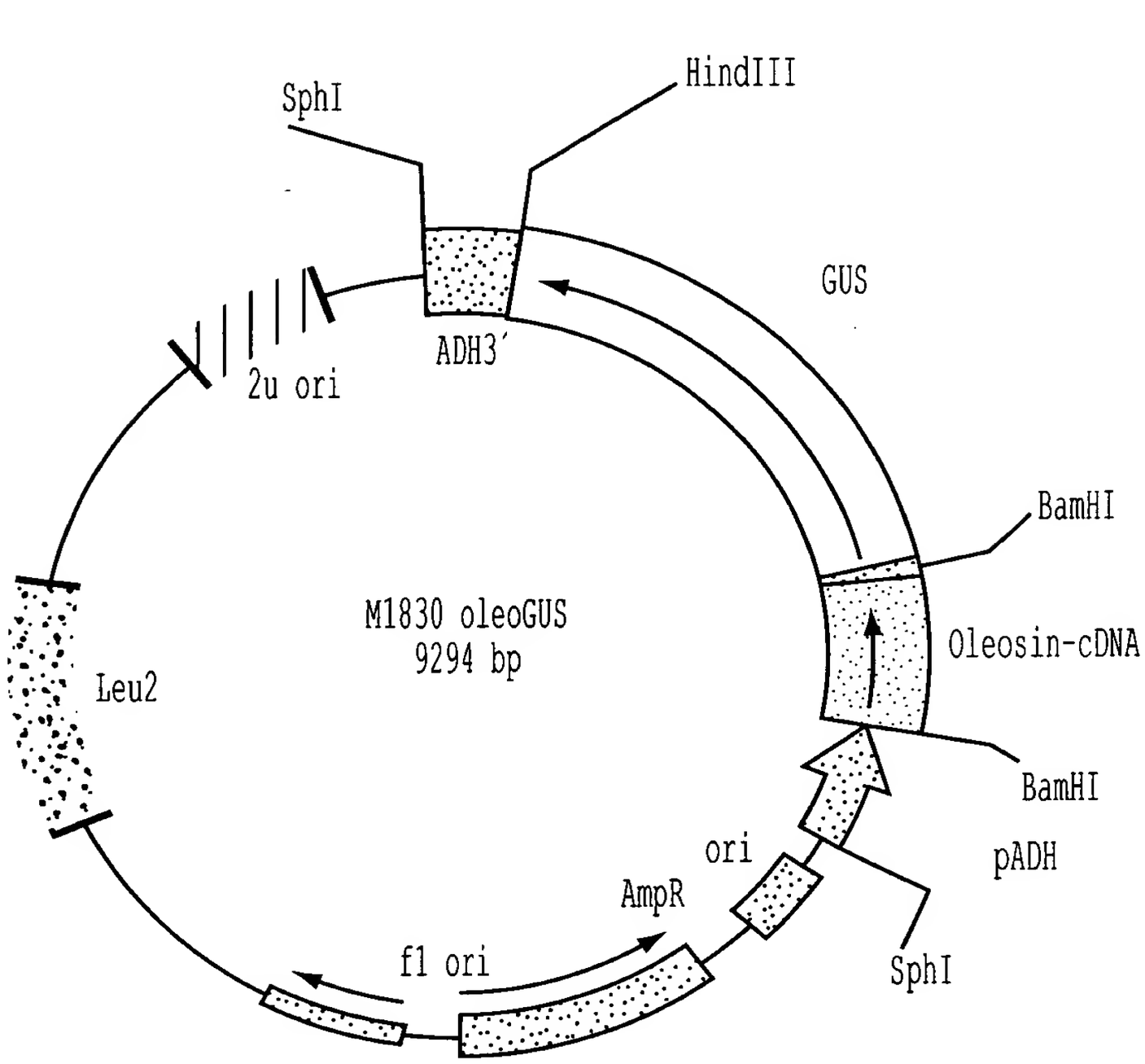

FIG. 8

Title: PREPARATION OF THIOREDOXIN AND THIOREDOXIN REDUCTASE ON OIL BODIES
Inventor(s): Maurice M. MOLONEY et al.
Appl. No.: 09/897,425

```
                10        20        30        40        50        60
TR              ATGAATGGTCTCGAAACTCACAACACAAGGCTCTGTATCGTAGGAAGTGGCCCAGCGGCA
ATTHIREDB       ATGAATGGTCTCGAAACTCACAACACAAGGCTCTGTATCGTAGGAAGTGGCCCAGCGGCA
                70        80        90        100       110       120
TR              CACACGGCGGCGATTTACGCAGCTAGGGCTGAACTTAAACCTCTTCTCTTCGAAGGATGG
ATTHIREDB       CACACGGCGGCGATTTACGCAGCTAGGGCTGAACTTAAACCTCTTCTCTTCGAAGGATGG
                130       140       150       160       170       180
TR              ATGGCTAACGACATCGCTCCCGGTGGTCAACTAACAACCACCACCGACGTCGAGAATTTC
ATTHIREDB       ATGGCTAACGACATCGCTCCCGGTGGTCAACT--CAACCAACCACCGCGT-GAGAATTTC
                190       200       210       220       230       240
TR              CCCGGATTTCCAGAAGGTATTCTCGGAGTAGAGCTCACTGACAAATTCCGTAAACAATCG
ATTHIREDB       CCCGGATTTCCAGAAGGTATTCTCGGAGTAGAGCTCACTGACAAATTCCGTAAACAATCG
                250       260       270       280       290       300
TR              GAGCGATTCGGTACTACGATATTTACAGAGACGGTGACGAAAGTCGATTTCTCTTCGAAA
ATTHIREDB       GAGCGATTCGGTACTACGATATTTACAGAGACGGTGACGAAAGTCGATTTCTCTTCGAAA
                310       320       330       340       350       360
TR              CCGTTTAAGCTATTCACAGATTCAAAAGCCATTCTCGCTGACGCTGTGATTCTCGCTACT
ATTHIREDB       CCGTTTAAGCTATTCACAGATTCAAAAGCCATTCTCGCTGACGCTGTGATTCTCGCTATC
                370       380       390       400       410       420
TR              GGAGCTGTGGCTAAGCGGCTTAGCTTCGTTGGATCTGGTGAAGGTTCTCGGAGGTTTCTGG
ATTHIREDB       GGAGCTGTGGCTAAGTGGCTTAGCTTCGTTGGATCTGGTGAAGTTCTCGGAGGTTTGTGG
                430       440       450       460       470       480
TR              AACCGTGGAATCTCCGCTTGTGCTGTTTGCGACGGAGCTGCTCCGATATTCCGTAACAAA
ATTHIREDB       AACCGTGGAATCTCCGCTTGTGCTGTTTGCGACGGAGCTGCTCCGATATTCCGCAACAAA
                490       500       510       520       530       540
TR              CCTCTTGCGGTGATCGGTGGAGGCGATTCAGCAATGGAAGAAGCAAACTTTCTTACAAAA
ATTHIREDB       CCTCTTGCGGTGATCGGTGGAGGCGATTCTGCAATGGAAGAAGCAAACTTTCTTACAAAA
                550       560       570       580       590       600
TR              TATGGATCTAAAGTGTATATAATCCATAGGAGAGATGCTTTTAGAGCGTCTAAGATTATG
ATTHIREDB       TATGGATCTAAAGTGTATATAATCGATAGGAGAGATGCTTTTAGAGCGTCTAAGATTATG
                610       620       630       640       650       660
TR              CAGCAGCGAGCTTTGTCTAATCCTAAGATTGATGTGATTTGGAACTCGTCTGTTGTGGAA
ATTHIREDB       CAGCAGCGAGCTTTGTCTAATCCTAAGATTGATGTGATTTGGAACTCGTCTGTTGTGGAA
                670       680       690       700       710       720
TR              GCTTATGGAGATGGAGAAAGAGATGTGCTTGGAGGATTGAAAGTGAAGAATGTGGTTACC
ATTHIREDB       GCTTATGGAGATGGAGAAAGAGATGTGCTTGGAGGATTGAAAGTGAAGAATGTGGTTACC
                730       740       750       760       770       780
TR              GGAGATGTTTCTGATTTAAAAGTTTCTGGATTGTTCTTTGCTATTGGTCATGAGCCAGCT
ATTHIREDB       GGAGATGTTTCTGATTTAAAAGTTTCTGGATTGTTCTTTGCTATTGGTCATGAGCCAGCT
                790       800       810       820       830       840
TR              ACCAAGTTTTTGGATGGTGGTGTTGAGTTAGATTCGGATGGTTATGTTGTCACGAAGCCT
ATTHIREDB       ACCAAGTTTTTGGATGGTGGTGTTGAGTTAGATTCGGATGGTTATGTTGTCACGAAGCCT
                850       860       870       880       890       900
TR              GGTACTACACAGACTAGCGTTCCCGGAGTTTTCGCTGCGGGTGATGTTCAGGATAAGAAG
ATTHIREDB       GGTACTACACAGACTAGCGTTCCCGGAGTTTTCGCTGCGGGTGATGTTCAGGATAAGAAG
                910       920       930       940       950       960
TR              TATAGGCAAGCCATCACTGCTGCAGGAACTGGGTGCATGGCAGCTTTGGATGCAGAGCAT
ATTHIREDB       TATAGGCAAGCCATCACTGCTGCAGGAACTGGGTGCATGGCAGCTTTGGATGCAGAGCAT
                970       980       990       1000      1010      1020
TR              TACTTACAAGAGATTGGATCTCAGCAAGGTAAGAGTGATTGA
ATTHIREDB       TACTTACAAGAGATTGGATCTCAGCAAGGTAAGAGTGATTGA
```

FIG. 9

```
   1  ATG AAT GGT CTC GAA ACT CAC AAC ACA AGG CTC TGT ATC GTA GGA AGT GGC CCA GCG GCA   60
   1  M   N   G   L   E   T   H   N   T   R   L   C   I   V   G   S   G   P   A   A    20

  61  CAC AGC GCG GCG ATT TAC CGA GCT AGG GCT GAA CTT AAA CCT CTT CTC TTC GAA GGA TGG  120
  21  H   T   A   A   I   Y   A   A   R   A   E   L   K   P   L   L   F   E   G   W    40

 121  ATG GCT AAC GAC ATC GCT CCC GGT GGT CAA CTA ACA ACC ACC ACC GAC GTC GAG AAT TTC  180
  41  M   A   N   D   I   A   P   G   G   Q   L   T   T   T   T   D   V   E   N   F    60

 181  CCC GGA TTT CCA GAA GGT ATT CAC GGA GTA GAG CTC ACT GAC AAA TTC CGT AAA CAA TCG  240
  61  P   G   F   P   E   G   I   L   G   V   E   L   T   D   K   F   R   K   Q   S    80

 241  GAG CGA TTC GGT ACT ACG ATA TTT ACA GAG ACG GTG ACG AAA GTC GAT TTC TCT TCG AAA  300
  81  E   R   F   G   T   T   I   F   T   E   T   V   T   K   V   D   F   S   S   K   100

 301  CCG TTT AAG CTA TTC ACA GAT TCA AAA GCC ATT CTC GCT GAC GCT GTG ATT CTC GCT ACT  360
 101  P   F   K   L   F   T   D   S   K   A   I   L   A   D   A   V   I   L   A   T   120

 361  GGA GCT GTG GCT AAG CGG CTT AGC TTC GTT GGA TCT GGT GAA GGT TCT GGA GGT TTC TGG  420
 121  G   A   V   A   K   R   L   S   F   V   G   S   G   E   G   S   G   G   F   W   140

 421  AAC CGT GGA ATC TCC GCT TGT GCT GTT TGC GAC GGA GCT GCT CCG ATA TTC CGT AAC AAA  480
 141  N   R   G   I   S   A   C   A   V   C   D   G   A   A   P   I   F   R   N   K   160

 481  CCT CTT GCG GTG ATC GGT GGA GGC GAT TCA GCA ATG GAA GAA GCA AAC TTT CTT ACA AAA  540
 161  P   L   A   V   I   G   G   G   D   S   A   M   E   E   A   N   F   L   T   K   180

 541  TAT GGA TCT AAA GTG TAT ATA ATC CAT AGG AGA GAT GCT TTT AGA GCG TCT AAG ATT ATG  600
 181  Y   G   S   K   V   Y   I   I   H   R   R   D   A   F   R   A   S   K   I   M   200

 601  CAG CAG CGA GCT TTG TCT AAT CCT AAG ATT GAT GTG ATT TGG AAC TCG TCT GTT GTG GAA  660
 201  Q   Q   R   A   L   S   N   P   K   I   D   V   I   W   N   S   S   V   V   E   220

 661  GCT TAT GGA GAT GGA GAA AGA GAT GTG CTT GGA GGA TTG AAA GTG AAG AAT GTG GTT ACC  720
 221  A   Y   G   D   G   E   R   D   V   L   G   G   L   K   V   K   N   V   V   T   240

 721  GGA GAT GTT TCT GAT TTA AAA GTT TCT GGA TTG TTC TTT GCT ATT GGT CAT GAG CCA GCT  780
 241  G   D   V   S   D   L   K   V   S   G   L   F   F   A   I   G   H   E   P   A   260

 781  ACC AAG TTT TTG GAT GGT GGT GTT GAG TTA GAT TCG GAT GGT TAT GTT GTC ACG AAG CCT  840
 261  T   K   F   L   D   G   G   V   E   L   D   S   D   G   Y   V   V   T   K   P   280

 841  GGT ACT ACA CAG ACT AGC GTT CCC GGA GTT TTC GCT GCG GGT GAT GTT CAG GAT AAG AAG  900
 281  G   T   T   Q   T   S   V   P   G   V   F   A   A   G   D   V   Q   D   K   K   300

 901  TAT AGG CAA GCC ATC ACT GCT GCA GGA ACT GGG TGC ATG GCA GCT TTG GAT GCA GAG CAT  960
 301  Y   R   Q   A   I   T   A   A   G   T   G   C   M   A   A   L   D   A   E   H   320

 961  TAC TTA CAA GAG ATT GGA TCT CAG CAA GGT AAG AGT GAT TGA                          1002
 321  Y   L   Q   E   I   G   S   Q   Q   G   K   S   D   *                          334
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FIG. 10

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                      10        20        30        40        50        60
TRANSLATION OF ATTHIREDB MNGLETHNTRLCIVGSGPAAHTAAIYAARAELKPLLFEGWMANDIAPGGQLNQPP-RENF
TRANSLATION OF TR        MNGLETHNTRLCIVGSGPAAHTAAIYAARAELKPLLFEGWMANDIAPGGQLITTTDVENF

                      70        80        90        100       110       120
TRANSLATION OF ATTHIREDB PGFPEGILGVELTDKFRKQSERFGTTIFTETVTKVDFSSKPFKLFTDSKAILADAVILAI
TRANSLATION OF TR        PGFPEGILGVELTDKFRKQSERFGTTIFTETVTKVDFSSKPFKLFTDSKAILADAVILAT

                      130       140       150       160       170       180
TRANSLATION OF ATTHIREDB GAVAKWLSFVGSGEVLGGLWNRGISACAVCDGAAPIFRNKPLAVIGGGDSAMEEANFLTK
TRANSLATION OF TR        GAVAKRLSFVGSGEGSGGFWNRGISACAVCDGAAPIFRNKPLAVIGGGDSAMEEANFLTK

                      190       200       210       220       230       240
TRANSLATION OF ATTHIREDB YGSKVYIIDRRDAFRASKIMQQRALSNPKIDVIWNSSVVEAYGDGERDVLGGLKVKNVVT
TRANSLATION OF TR        YGSKVYIIHRRDAFRASKIMQQRALSNPKIDVIWNSSVVEAYGDGERDVLGGLKVKNVVT

                      250       260       270       280       290       300
TRANSLATION OF ATTHIREDB GDVSDLKVSGLFFAIGHEPATKFLDGGVELDSDGYVVTKPGTTQTSVPGVFAAGDVQDKK
TRANSLATION OF TR        GDVSDLKVSGLFFAIGHEPATKFLDGGVELDSDGYVVTKPGTTQTSVPGVFAAGDVQDKK

                      310       320       330       340       350       360
TRANSLATION OF ATTHIREDB YRQAITAAGTGCMAALDAEHYLQEIGSQQGKSD
TRANSLATION OF TR        YRQAITAAGTGCMAALDAEHYLQEIGSQQGKSD
```

FIG. 11

PstI

```
   1 ctgcaggaattcattgtactcccagtatcattatagtgaaagttttggctctctcgccggtggtttttacctctattta  80

  81 aaggggttttccacctaaaaattctggtatcattctcactttacttgttactttaatttctcataatctttggttgaaat 160

 161 tatcacgcttccgcacacgatatccctacaaatttattatttgttaaacattttcaaaccgcataaaattttatgaagtc 240

 241 ccgtctatctttaatgtagtctaacattttcatattgaaatatataatttacttaattttagcgttggtagaaagcataa 320

 321 tgatttattcttattcttcttcatataaatgtttaatatacaatataaacaaattctttaccttaagaaggatttcccat 400

 401 tttatattttaaaaatatatttatcaaatatttttcaaccacgtaaatctcataataataagttgtttcaaaagtaataa 480

 481 aatttaactccataatttttttattcgactgatcttaaagcaacacccagtgacacaactagccatttttttctttgaat 560

 561 aaaaaaatccaattatcattgtatttttttatacaatgaaaatttcaccaaacaatcatttgtggtatttctgaagcaa 640

 641 gtcatgttatgcaaaattctataattcccatttgacactacggaagtaactgaagatctgcttttacatgcgagacacat 720

 721 cttctaaagtaattttaataatagttactatattcaagatttcatatatcaaatactcaatattacttctaaaaaattaa 800

 801 ttagatataattaaaatattacttttttaattttaagtttaattgttgaatttgtgactattgatttattattctactat 880

 881 gtttaaattgttttatagatagtttaaagtaaatataagtaatgtagtagagtgttagagtgttaccctaaaccataaac 960

 961 tataagatttatggtggactaattttcatatatttcttattgcttttacctttcttggtatgtaagtccgtaactggaa 1040

1041 ttactgtgggttgccatggcactctgtggtcttttggttcatgcatggatgcttgcgcaagaaaaagacaaagaacaaag 1120

1121 aaaaaagacaaaacagagagacaaaacgcaatcacacaaccaactcaaattagtcactggctgatcaagatcgccgcgtc 1200

1201 catgtatgtctaaatgccatgcaaagcaacacgtgcttaacatgcactttaaatggctcacccatctcaacccacacaca 1280

1281 aacacattgccttttcttcatcatcaccacaaccacctgtatatattcattctcttccgccacctcaatttcttcactt 1360

1361 caacacacgtcaacctgcatatgcgtgtcatcccatgcccaaatctccatgcatgttccaaccaccttctctcttatata 1440

1441 atacctataaatacctctaatatcactcacttctttcatcatccatccatccagagtactactactctactactataata 1520

1521 ccccaacccaactcatattcaatactactctact ATG GCT TCG GAA GAA GGA CAA GTG ATC GCC TGC  1587
   1                                    M   A   S   E   E   G   Q   V   I   A   C    11

1588 CAC ACC GTT GAG ACA TGG AAC GAG CAG CTT CAG AAG GCT AAT GAA TCC AAA ACT CTT GTG  1647
  12 H   T   V   E   T   W   N   E   Q   L   Q   K   A   N   E   S   K   T   L   V   31

1648 GTG GTT GAT TTC ACG GCT TCT TGG TGT GGA CCA TGT CGT TTC ATC GCT CCA TTC TTT GCT 1707
  32 V   V   D   F   T   A   S   W   C   G   P   C   R   F   I   A   P   F   F   A   51

1708 GAT TTG GCT AAG AAA CTT CCT AAC GTG CTT TTC CTC AAG GTT GAT ACT GAT GAA TTG AAG 1767
  52 D   L   A   K   K   L   P   N   V   L   F   L   K   V   D   T   D   E   L   K   71
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FIG. 12

```
1768 TCG GTG GCA AGT GAT TGG GCG ATA CAG GCG ATG CCA ACC TTC ATG TTT TTG AAG GAA GGG 1827
  72 S   V   A   S   D   W   A   I   Q   A   M   P   T   F   M   F   L   K   E   G   91

1828 AAG ATT TTG GAC AAA GTT GTT GGA GCC AAG AAA GAT GAG CTT CAG TCT ACC ATT GCC AAA 1887
  92 K   I   L   D   K   V   V   G   A   K   K   D   E   L   Q   S   T   I   A   K   111

                HindIII

1888 CAC TTG GCT TAA gcttaataagtatgaactaaaatgcatgtaggtgtaagagctcatggagagcatggaatattgt 1963
 112 H   L   A   *                                                                   115

1964 atccgaccatgtaacagtataataactgagctccatctcacttcttctatgaataaacaaaggatgttatgatatattaa 2043

2044 cactctatctatgcaccttattgttctatgataaatttcctcttattattataaatcatctgaatcgtgacggcttatgg 2123

2124 aatgcttcaaatagtacaaaaacaaatgtgtactataagactttctaaacaattctaactttagcattgtgaacgagaca 2203

2204 taagtgttaagaagacataacaattataatggaagaagtttgtctccatttatatattatatattacccacttatgtatt 2283

2284 atattaggatgttaaggagacataacaattataaagagagaagtttgtatccatttatatattatatactacccatttat 2363

2364 atattatacttatccacttatttaatgtctttataaggtttgatccatgatatttctaatattttagttgatatgtatat 2443

2444 gaaagggtactatttgaactctcttactctgtataaaggttggatcatccttaaagtgggtctatttaattttattgctt 2523

2524 cttacagataaaaaaaaaattatgagttggtttgataaaatattgaaggatttaaaataataataaataataaataacat 2603

2604 ataatatatgtatataaatttattataatataacatttatctataaaaaagtaaatattgtcataaatctatacaatcgt 2683

2684 ttagccttgctggacgactctcaattatttaaacgagagtaaacatatttgacttttggttatttaacaaattattatt 2763

2764 taacactatatgaaatttttttttttatcggcaaggaaataaaattaaattaggagggacaatggtgtgtcccaatcct 2843

2844 tatacaaccaacttccacaggaaggtcaggtcggggacaacaaaaaaacaggcaagggaaatttttaatttgggttgtc 2923

2924 ttgtttgctgcataatttatgcagtaaaacactacacataacccttttagcagtagagcaatggttgaccgtgtgcttag 3003

3004 cttcttttatttatttttttatcagcaaagaataaataaaataaaatgagacacttcagggatgtttcaacccttatac 3063

3084 aaaaccccaaaaacaagtttcctagcaccctaccaactaaggtacc                                  3129
                                                KpnI
```

FIG. 12A

PstI
1 ctgcaggaattcattgtactcccagtatcattatagtgaaagttttggctctctcgccggtggtttttacctctattta 80

81 aaggggttttccacctaaaaattctggtatcattctcactttacttgttactttaatttctcataatctttggttgaaat 160

161 tatcacgcttccgcacacgatatccctacaaatttattatttgttaaacattttcaaaccgcataaaattttatgaagtc 240

241 ccgtctatctttaatgtagtctaacattttcatattgaaatataataatttacttaattttagcgttggtagaaagcataa 320

321 tgatttattcttattcttcttcatataaatgtttaatatacaatataaacaaattctttaccttaagaaggatttcccat 400

401 tttatattttaaaaatatatttatcaaatatttttcaaccacgtaaatctcataataataagttgtttcaaaagtaataa 480

481 aatttaactccataatttttttattcgactgatcttaaagcaacacccagtgacacaactagccatttttttctttgaat 560

561 aaaaaaatccaattatcattgtatttttttttatacaatgaaaatttcaccaaacaatcatttgtggtatttctgaagcaa 640

641 gtcatgttatgcaaaattctataattcccatttgacactacggaagtaactgaagatctgcttttacatgcgagacacat 720

721 cttctaaagtaattttaataatagttactatattcaagatttcatatatcaaatactcaatattacttctaaaaaattaa 800

801 ttagatataattaaaatattacttttttaattttaagtttaattgttgaatttgtgactattgatttattattctactat 880

881 gtttaaattgttttatagatagtttaaagtaaatataagtaatgtagtagagtgttagagtgttaccctaaaccataaac 960

961 tataagatttatggtggactaattttcatatatttcttattgcttttacctttcttggtatgtaagtccgtaactggaa 1040

1041 ttactgtgggttgccatggcactctgtggtcttttggttcatgcatggatgcttgcgcaagaaaaagacaaagaacaaag 1120

1121 aaaaaagacaaaacagagagacaaaacgcaatcacacaaccaactcaaattagtcactggctgatcaagatcgccgcgtc 1200

1201 catgtatgtctaaatgccatgcaaagcaacacgtgcttaacatgcactttaaatggctcacccatctcaacccacacaca 1280

1281 aacacattgccttttcttcatcatcaccacaaccacctgtatatattcattctcttccgccacctcaatttcttcactt 1360

1361 caacacacgtcaacctgcatatgcgtgtcatcccatgcccaaatctccatgcatgttccaaccaccttctctcttatata 1440

1441 atacctataaatacctctaatatcactcacttctttcatcatccatccatccagagtactactactctactactataata 1520

1521 ccccaacccaactcatattcaatactactctact ATG GCG GAT ACA GCT AGA GGA ACC CAT CAC GAT 1587
1 M A D T A R G T H H D 11

1588 ATC ATC GGC AGA GAC CAG TAC CCG ATG ATG GGC CGA GAC CGA GAC CAG TAC CAG ATG TCC 1647
12 I I G R D Q Y P M M G R D R D Q Y Q M S 31

1648 GGA CGA GGA TCT GAC TAC TCC AAG TCT AGG CAG ATT GCT AAA GCT GCA ACT GCT GTC ACA 1707
32 G R G S D Y S K S R Q I A K A A T A V T 51

1708 GCT GGT GGT TCC CTC CTT GTT CTC TCC AGC CTT ACC CTT GTT GGA ACT GTC ATA GCT TTG 1767
52 A G G S L L V L S S L T L V G T V I A L 71

FIG. 13

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1768 ACT GTT GCA ACA CCT CTG CTC GTT ATC TTC AGC CCA ATC CTT GTC CCG GCT CTC ATC ACA 1827
  72 T   V   A   T   P   L   L   V   I   F   S   P   I   L   V   P   A   L   I   T   91

1828 GTT GCA CTC CTC ATC ACC GGT TTT CTT TCC TCT GGA GGG TTT GGC ATT GCC GCT ATA ACC 1887
  92 V   A   L   L   I   T   G   F   L   S   S   G   G   F   G   I   A   A   I   T  111

1888 GTT TTC TCT TGG ATT TAC AA gtaagcacacatttatcatcttacttcataatttgtgcaatatgtgcatgca 1960
 112 V   F   S   W   I   Y   K                                                      118

1961 tgtgttgagccagtagctttggatcaatttttttggtcgaataacaaatgtaacaataagaaattgcaaattctagggaa 2040

2041 catttggttaactaaatacgaaatttgacctagctagcttgaatgtgtctgtgtatatcatctatataggtaaaatgctt 2120

2121 ggtatgatacctattgattgtgaatag G TAC GCA ACG GGA GAG CAC CCA CAG GGA TCA GAC AAG    2184
 119                             Y   A   T   G   E   H   P   Q   G   S   D   K      130

2185 TTG GAC AGT GCA AGG ATG AAG TTG GGA AGC AAA GCT CAG GAT CTG AAA GAC AGA GCT CAG 2244
 131 L   D   S   A   R   M   K   L   G   S   K   A   Q   D   L   K   D   R   A   Q  150

2245 TAC TAC GGA CAG CAA CAT ACT GGT GGG GAA CAT GAC CGT GAC CGT ACT CGT GGT GGC CAG 2304
 151 Y   Y   G   Q   Q   H   T   G   G   E   H   D   R   D   R   T   R   G   G   Q  170

                 NcoI
2305 CAC ACT ACC ATG GCT TCG GAA GAA GGA CAA GTG ATC GCC TGC CAC ACC GTT GAG ACA TGG 2364
 171 H   T   T   M   A   S   E   E   G   Q   V   I   A   C   H   T   V   E   T   W  190

2365 AAC GAG CAG CTT CAG AAG GCT AAT GAA TCC AAA ACT CTT GTG GTG GTT GAT TTC ACG GCT 2424
 191 N   E   Q   L   Q   K   A   N   E   S   K   T   L   V   V   V   D   F   T   A  210

2425 TCT TGG TGT GGA CCA TGT CGT TTC ATC GCT CCA TTC TTT GCT GAT TTG GCT AAG AAA CTT 2484
 211 S   W   C   G   P   C   R   F   I   A   P   F   F   A   D   L   A   K   K   L  230

2485 CCT AAC GTG CTT TTC CTC AAG GTT GAT ACT GAT GAA TTG AAG TCG GTG GCA AGT GAT TGG 2544
 231 P   N   V   L   F   L   K   V   D   T   D   E   L   K   S   V   A   S   D   W  250

2545 GCG ATA CAG GCG ATG CCA ACC TTC ATG TTT TTG AAG GAA GGG AAG ATT TTG GAC AAA GTT 2604
 251 A   I   Q   A   M   P   T   F   M   F   L   K   E   G   K   I   L   D   K   V  270

2605 GTT GGA GCC AAG AAA GAT GAG CTT CAG TCT ACC ATT GCC AAA CAC TTG GCT TAA gcttaata 2666
 271 V   G   A   K   K   D   E   L   Q   S   T   I   A   K   H   L   A   *          288

2667 agtatgaactaaaatgcatgtaggtgtaagagctcatggagagcatggaatattgtatccgaccatgtaacagtataata 2746

2747 actgagctccatctcacttcttctatgaataaacaaaggatgttatgatatattaacactctatctatgcaccttattgt 2826

2827 tctatgataaatttcctcttattattataaatcatctgaatcgtgacggcttatggaatgcttcaaatagtacaaaaaca 2906

2907 aatgtgtactataagactttctaaacaattctaactttagcattgtgaacgagacataagtgttaagaagacataacaat 2986

2987 tataatggaagaagtttgtctccatttatatattatatattacccacttatgtattatattaggatgttaaggagacata 3066
```

FIG. 13A

3067 acaattataaagagagaagtttgtatccatttatatattatatactacccatttatatattatacttatccacttattta 3146

3147 atgtctttataaggtttgatccatgatatttctaatattttagttgatatgtatatgaaagggtactatttgaactctct 3226

3227 tactctgtataaaggttggatcatccttaaagtgggtctatttaattttattgcttcttacagataaaaaaaaaattatg 3306

3307 agttggtttgataaaatattgaaggatttaaaataataaataataaataacatataatatatgtatataaatttatt 3386

3387 ataatataacatttatctataaaaaagtaaatattgtcataaatctatacaatcgtttagccttgctggacgactctcaa 3466

3467 ttatttaaacgagagtaaacatatttgacttttggttatttaacaaattattatttaacactatatgaaatttttttt 3546

3547 tttatcggcaaggaaataaaattaaattaggagggacaatggtgtgtcccaatccttatacaaccaacttccacaggaag 3626

3627 gtcaggtcggggacaacaaaaaaacaggcaagggaaatttttaatttgggttgtcttgtttgctgcataatttatgcag 3706

3707 taaaacactacacataacccttttagcagtagagcaatggttgaccgtgtgcttagcttcttttatttttatttttttatc 3786

3787 agcaaagaataaataaaataaaatgagacacttcagggatgtttcaacccttatacaaaaccccaaaaacaagtttccta 3866

3867 gcaccctaccaactaaggtacc 3888

KpnI

FIG. 13B

PstI
1 ctgcaggaattcattgtactcccagtatcattatagtgaaagttttggctctctcgccggtggtttttacctctattta 80

81 aaggggttttccacctaaaaattctggtatcattctcactttacttgttactttaatttctcataatctttggttgaaat 160

161 tatcacgcttccgcacacgatatccctacaaatttattatttgttaaacattttcaaaccgcataaaattttatgaagtc 240

241 ccgtctatctttaatgtagtctaacattttcatattgaaatatataatttacttaattttagcgttggtagaaagcataa 320

321 tgatttattcttattcttcttcatataaatgtttaatatacaatataaacaaattctttaccttaagaaggatttcccat 400

401 tttatattttaaaaatatatttatcaaatatttttcaaccacgtaaatctcataataataagttgtttcaaaagtaataa 480

481 aatttaactccataatttttttattcgactgatcttaaagcaacacccagtgacacaactagccatttttttctttgaat 560

561 aaaaaaatccaattatcattgtatttttttatacaatgaaaatttcaccaaacaatcatttgtggtatttctgaagcaa 640

641 gtcatgttatgcaaaattctataattcccatttgacactacggaagtaactgaagatctgcttttacatgcgagacacat 720

721 cttctaaagtaattttaataatagttactatattcaagatttcatatatcaaatactcaatattacttctaaaaaattaa 800

801 ttagatataattaaaatattacttttttaattttaagtttaattgttgaatttgtgactattgatttattattctactat 880

881 gtttaaattgttttatagatagtttaaagtaaatataagtaatgtagtagagtgttagagtgttaccctaaaccataaac 960

961 tataagatttatggtggactaattttcatatatttcttattgcttttacctttttcttggtatgtaagtccgtaactggaa 1040

1041 ttactgtgggttgccatggcactctgtggtcttttggttcatgcatggatgcttgcgcaagaaaaagacaaagaacaaag 1120

1121 aaaaaagacaaaacagagagacaaaacgcaatcacacaaccaactcaaattagtcactggctgatcaagatcgccgcgtc 1200

1201 catgtatgtctaaatgccatgcaaagcaacacgtgcttaacatgcactttaaatggctcacccatctcaacccacacaca 1280

1281 aacacattgccttttcttcatcatcaccacaaccacctgtatatattcattctcttccgccacctcaatttcttcactt 1360

1361 caacacacgtcaacctgcatatgcgtgtcatcccatgcccaaatctccatgcatgttccaaccaccttctctcttatata 1440

1441 atacctataaatacctctaatatcactcacttctttcatcatccatccatccagagtactactctctactactataata 1520

1521 ccccaacccaactcatattcaatactactctact ATG GCT TCG GAA GAA GGA CAA GTG ATC GCC TGC 1587
1 M A S E E G Q V I A C 11

1588 CAC ACC GTT GAG ACA TGG AAC GAG CAG CTT CAG AAG GCT AAT GAA TCC AAA ACT CTT GTG 1647
12 H T V E T W N E Q L Q K A N E S K T L V 31

1648 GTG GTT GAT TTC ACG GCT TCT TGG TGT GGA CCA TGT CGT TTC ATC GCT CCA TTC TTT GCT 1707
32 V V D F T A S W C G P C R F I A P F F A 51

1708 GAT TTG GCT AAG AAA CTT CCT AAC GTG CTT TTC CTC AAG GTT GAT ACT GAT GAA TTG AAG 1767
52 D L A K K L P N V L F L K V D T D E L K 71

FIG. 14

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1768 TCG GTG GCA AGT GAT TGG GCG ATA CAG GCG ATG CCA ACC TTC ATG TTT TTG AAG GAA GGG 1827
  72 S   V   A   S   D   W   A   I   Q   A   M   P   T   F   M   F   L   K   E   G  91

1828 AAG ATT TTG GAC AAA GTT GTT GGA GCC AAG AAA GAT GAG CTT CAG TCT ACC ATT GCC AAA 1887
  92 K   I   L   D   K   V   V   G   A   K   K   D   E   L   Q   S   T   I   A   K  111

1888 CAC TTG GCT ATG GCG GAT ACA GCT AGA GGA ACC CAT CAC GAT ATC ATC GGC AGA GAC CAG 1947
 112 H   L   A   M   A   D   T   A   R   G   T   H   H   D   I   I   G   R   D   Q  131

1948 TAC CCG ATG ATG GGC CGA GAC CGA GAC CAG TAC CAG ATG TCC GGA CGA GGA TCT GAC TAC 2007
 132 Y   P   M   M   G   R   D   R   D   Q   Y   Q   M   S   G   R   G   S   D   Y  151

2008 TCC AAG TCT AGG CAG ATT GCT AAA GCT GCA ACT GCT GTC ACA GCT GGT GGT TCC CTC CTT 2067
 152 S   K   S   R   Q   I   A   K   A   A   T   A   V   T   A   G   G   S   L   L  171

2068 GTT CTC TCC AGC CTT ACC CTT GTT GGA ACT GTC ATA GCT TTG ACT GTT GCA ACA CCT CTG 2127
 172 V   L   S   S   L   T   L   V   G   T   V   I   A   L   T   V   A   T   P   L  191

2128 CTC GTT ATC TTC AGC CCA ATC CTT GTC CCG GCT CTC ATC ACA GTT GCA CTC CTC ATC ACC 2187
 192 L   V   I   F   S   P   I   L   V   P   A   L   I   T   V   A   L   L   I   T  211

2188 GGT TTT CTT TCC TCT GGA GGG TTT GGC ATT GCC GCT ATA ACC GTT TTC TCT TGG ATT TAC 2247
 212 G   F   L   S   S   G   G   F   G   I   A   A   I   T   V   F   S   W   I   Y  231

2248 AA gtaagcacacatttatcatcttacttcataattttgtgcaatatgtgcatgcatgtgttgagccagtagctttggat 2326
 232 K                                                                              232

2327 caatttttttggtcgaataacaaatgtaacaataagaaattgcaaattctagggaacatttggttaactaaatacgaaat 2406

2407 ttgacctagctagcttgaatgtgtctgtgtatatcatctatataggtaaaatgcttggtatgatacctattgattgtgaa 2486

2487 tag G TAC GCA ACG GGA GAG CAC CCA CAG GGA TCA GAC AAG TTG GAC AGT GCA AGG ATG    2544
 233      Y   A   T   G   E   H   P   Q   G   S   D   K   L   D   S   A   R   M    250

2545 AAG TTG GGA AGC AAA GCT CAG GAT CTG AAA GAC AGA GCT CAG TAC TAC GGA CAG CAA CAT 2604
 251 K   L   G   S   K   A   Q   D   L   K   D   R   A   Q   Y   Y   G   Q   Q   H  270
                                                                  HindIII

2605 ACT GGT GGG GAA CAT GAC CGT GAC CGT ACT CGT GGT GGC CAG CAC ACT ACT TAA gcttaata 2666
 271 T   G   G   E   H   D   R   D   R   T   R   G   G   Q   H   T   T   *          288

2667 agtatgaactaaaatgcatgtaggtgtaagagctcatggagagcatggaatattgtatccgaccatgtaacagtataata 2746

2747 actgagctccatctcacttcttctatgaataaacaaaggatgttatgatattaacactctatctatgcaccttattgt 2826

2827 tctatgataaatttcctcttattattataaatcatctgaatcgtgacggcttatggaatgcttcaaatagtacaaaaaca 2906

2907 aatgtgtactataagactttctaaacaattctaactttagcattgtgaacgagacataagtgttaagaagacataacaat 2986

2987 tataatggaagaagtttgtctccatttatatattatatattacccacttatgtattatattaggatgttaaggagacata 3066
```

FIG. 14A

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3067 acaattataaagagagaagtttgtatccatttatatattatatactacccatttatatattatacttatccacttattta 3146

3147 atgtctttataaggtttgatccatgatatttctaatattttagttgatatgtatatgaaagggtactatttgaactctct 3226

3227 tactctgtataaaggttggatcatccttaaagtgggtctatttaattttattgcttcttacagataaaaaaaaaattatg 3306

3307 agttggtttgataaaatattgaaggatttaaaataataaataataaataacatataatatatgtatataaatttatt 3386

3387 ataatataacatttatctataaaaaagtaaatattgtcataaatctatacaatcgtttagccttgctggacgactctcaa 3466

3467 ttatttaaacgagagtaaacatatttgacttttggttatttaacaaattattatttaacactatatgaaatttttttt 3546

3547 tttatcggcaaggaaataaaattaaattaggagggacaatggtgtgtcccaatccttatacaaccaacttccacaggaag 3626

3627 gtcaggtcggggacaacaaaaaaacaggcaagggaaatttttaatttgggttgtcttgtttgctgcataatttatgcag 3706

3707 taaaacactacacataacccttttagcagtagagcaatggttgaccgtgtgcttagcttcttttatttatttttttatc 3786

3787 agcaaagaataaataaaataaaatgagacacttcagggatgtttcaacccttatacaaaaccccaaaaacaagtttccta 3866

3867 gcaccctaccaactaaggtacc 3888

KpnI

FIG. 14B

PstI

```
   1 ctgcaggaattcattgtactcccagtatcattatagtgaaagttttggctctctcgccggtggtttttacctctattta  80

  81 aaggggttttccacctaaaaattctggtatcattctcactttacttgttactttaatttctcataatctttggttgaaat 160

 161 tatcacgcttccgcacacgatatccctacaaatttattatttgttaaacattttcaaaccgcataaaattttatgaagtc 240

 241 ccgtctatctttaatgtagtctaacattttcatattgaaatataataatttacttaattttagcgttggtagaaagcataa 320

 321 tgatttattcttattcttcttcatataaatgtttaatatacaatataaacaaattctttaccttaagaaggatttcccat 400

 401 tttatattttaaaaatatatttatcaaatatttttcaaccacgtaaatctcataataataagttgtttcaaaagtaataa 480

 481 aatttaactccataatttttttattcgactgatcttaaagcaacacccagtgacacaactagccatttttttctttgaat 560

 561 aaaaaaatccaattatcattgtatttttttttatacaatgaaaatttcaccaaacaatcatttgtggtatttctgaagcaa 640

 641 gtcatgttatgcaaaattctataattcccatttgacactacggaagtaactgaagatctgcttttacatgcgagacacat 720

 721 cttctaaagtaattttaataatagttactatattcaagatttcatatatcaaatactcaatattacttctaaaaaattaa 800

 801 ttagatataattaaaatattacttttttaattttaagtttaattgttgaatttgtgactattgatttattattctactat 880

 881 gtttaaattgttttatagatagtttaaagtaaatataagtaatgtagtagagtgttagagtgttaccctaaaccataaac 960

 961 tataagatttatggtggactaattttcatatatttcttattgcttttacctttttcttggtatgtaagtccgtaactggaa 1040

1041 ttactgtgggttgccatggcactctgtggtcttttggttcatgcatggatgcttgcgcaagaaaaagacaaagaacaaag 1120

1121 aaaaaagacaaaacagagagacaaaacgcaatcacacaaccaactcaaattagtcactggctgatcaagatcgccgcgtc 1200

1201 catgtatgtctaaatgccatgcaaagcaacacgtgcttaacatgcactttaaatggctcacccatctcaacccacacaca 1280

1281 aacacattgccttttcttcatcatcaccacaaccacctgtatatattcattctcttccgccacctcaatttcttcactt 1360

1361 caacacacgtcaacctgcatatgcgtgtcatcccatgcccaaatctccatgcatgttccaaccaccttctctcttatata 1440

1441 atacctataaatacctctaatatcactcacttctttcatcatccatccatccagagtactactactctactactataata 1520

1521 ccccaacccaactcatattcaatactactctact ATG AAT GGT CTC GAA ACT CAC AAC ACA AGG CTC  1587
   1                                    M   N   G   L   E   T   H   N   T   R   L    11

1588 TGT ATC GTA GGA AGT GGC CCA GCG GCA CAC ACG GCG GCG ATT TAC GCA GCT AGG GCT GAA  1647
  12 C   I   V   G   S   G   P   A   A   H   T   A   A   I   Y   A   A   R   A   E    31

1648 CTT AAA CCT CTT CTC TTC GAA GGA TGG ATG GCT AAC GAC ATC GCT CCC GGT GGT CAA CTA  1707
  32 L   K   P   L   L   F   E   G   W   M   A   N   D   I   A   P   G   G   Q   L    51

1708 ACA ACC ACC ACC GAC GTC GAG AAT TTC CCC GGA TTT CCA GAA GGT ATT CTC GGA GTA GAG  1767
  52 T   T   T   T   D   V   E   N   F   P   G   F   P   E   G   I   L   G   V   E    71
```

FIG. 15

```
1768 CTC ACT GAC AAA TTC CGT AAA CAA TCG GAG CGA TTC GGT ACT ACG ATA TTT ACA GAG ACG 1827
  72 L   T   D   K   F   R   K   Q   S   E   R   F   G   T   T   I   F   T   E   T   91

1828 GTG ACG AAA GTC GAT TTC TCT TCG AAA CCG TTT AAG CTA TTC ACA GAT TCA AAA GCC ATT 1887
  92 V   T   K   V   D   F   S   S   K   P   F   K   L   F   T   D   S   K   A   I  111

1888 CTC GCT GAC GCT GTG ATT CTC GCT ACT GGA GCT GTG GCT AAG CGG CTT AGC TTC GTT GGA 1947
 112 L   A   D   A   V   I   L   A   T   G   A   V   A   K   R   L   S   F   V   G  131

1948 TCT GGT GAA GGT TCT GGA GGT TTC TGG AAC CGT GGA ATC TCC GCT TGT GCT GTT TGC GAC 2007
 132 S   G   E   G   S   G   G   F   W   N   R   G   I   S   A   C   A   V   C   D  151

2008 GGA GCT GCT CCG ATA TTC CGT AAC AAA CCT CTT GCG GTG ATC GGT GGA GGC GAT TCA GCA 2067
 152 G   A   A   P   I   F   R   N   K   P   L   A   V   I   G   G   G   D   S   A  171

2068 ATG GAA GAA GCA AAC TTT CTT ACA AAA TAT GGA TCT AAA GTG TAT ATA ATC CAT AGG AGA 2127
 172 M   E   E   A   N   F   L   T   K   Y   G   S   K   V   Y   I   I   H   R   R  191

2128 GAT GCT TTT AGA GCG TCT AAG ATT ATG CAG CAG CGA GCT TTG TCT AAT CCT AAG ATT GAT 2187
  92 D   A   F   R   A   S   K   I   M   Q   Q   R   A   L   S   N   P   K   I   D  211

2188 GTG ATT TGG AAC TCG TCT GTT GTG GAA GCT TAT GGA GAT GGA GAA AGA GAT GTG CTT GGA 2247
 212 V   I   W   N   S   S   V   V   E   A   Y   G   D   G   E   R   D   V   L   G  231

2248 GGA TTG AAA GTG AAG AAT GTG GTT ACC GGA GAT GTT TCT GAT TTA AAA GTT TCT GGA TTG 2307
 232 G   L   K   V   K   N   V   V   T   G   D   V   S   D   L   K   V   S   G   L  251

2308 TTC TTT GCT ATT GGT CAT GAG CCA GCT ACC AAG TTT TTG GAT GGT GGT GTT GAG TTA GAT 2367
 252 F   F   A   I   G   H   E   P   A   T   K   F   L   D   G   G   V   E   L   D  271

2368 TCG GAT GGT TAT GTT GTC ACG AAG CCT GGT ACT ACA CAG ACT AGC GTT CCC GGA GTT TTC 2427
 272 S   D   G   Y   V   V   T   K   P   G   T   T   Q   T   S   V   P   G   V   F  291

2428 GCT GCG GGT GAT GTT CAG GAT AAG AAG TAT AGG CAA GCC ATC ACT GCT GCA GGA ACT GGG 2487
 292 A   A   G   D   V   Q   D   K   K   Y   R   Q   A   I   T   A   A   G   T   G  311

2488 TGC ATG GCA GCT TTG GAT GCA GAG CAT TAC TTA CAA GAG ATT GGA TCT CAG CAA GGT AAG 2547
 312 C   M   A   A   L   D   A   E   H   Y   L   Q   E   I   G   S   Q   Q   G   K  331

2548 AGT GAT TGA agcttaataagtatgaactaaaatgcatgtaggtgtaagagctcatggagagcatggaatattgtatc 2624
 332 S   D   *  HindIII                                                              334

2625 cgaccatgtaacagtataataactgagctccatctcacttcttctatgaataaacaaaggatgttatgatatattaacac 2704

2705 tctatctatgcaccttattgttctatgataaatttcctcttattattataaatcatctgaatcgtgacggcttatggaat 2784

2785 gcttcaaatagtacaaaaacaaatgtgtactataagactttctaaacaattctaactttagcattgtgaacgagacataa 2864

2865 gtgttaagaagacataacaattataatggaagaagtttgtctccatttatatattatatattacccacttatgtattata 2944
```

FIG. 15A

2945 ttaggatgttaaggagacataacaattataaagagagaagtttgtatccatttatatattatatactacccatttatata 3024

3025 ttatacttatccacttatttaatgtctttataaggtttgatccatgatatttctaatattttagttgatatgtatatgaa 3104

3105 agggtactatttgaactctcttactctgtataaaggttggatcatccttaaagtgggtctatttaattttattgcttctt 3184

3185 acagataaaaaaaaaattatgagttggtttgataaaatattgaaggatttaaaataataaataataaataacatata 3264

3265 atatatgtatataaatttattataatataacatttatctataaaaaagtaaatattgtcataaatctatacaatcgttta 3344

3345 gccttgctggacgactctcaattatttaaacgagagtaaacatatttgacttttggttatttaacaaattattatttaa 3424

3425 cactatatgaaatttttttttttatcggcaaggaaataaaattaaattaggagggacaatggtgtgtcccaatccttat 3504

3505 acaaccaacttccacaggaaggtcaggtcggggacaacaaaaaaacaggcaagggaaatttttaatttgggttgtcttg 3584

3585 tttgctgcataatttatgcagtaaaacactacacataacccttttagcagtagagcaatggttgaccgtgtgcttagctt 3664

3665 cttttatttttatttttttatcagcaaagaataaataaaataaaatgagacacttcagggatgtttcaacccttatacaaa 3744

3745 accccaaaaacaagtttcctagcaccctaccaactaaggtacc 3787

KpnI

FIG. 15B

PstI

```
   1 ctgcaggaattcattgtactcccagtatcattatagtgaaagttttggctctctgccggtggtttttacctctattta  80

  81 aaggggttttccacctaaaaattctggtatcattctcactttacttgttactttaatttctcataatctttggttgaaat 160

 161 tatcacgcttccgcacacgatatccctacaaatttattatttgttaaacattttcaaaccgcataaaattttatgaagtc 240

 241 ccgtctatctttaatgtagtctaacattttcatattgaaatatataatttacttaattttagcgttggtagaaagcataa 320

 321 tgatttattcttattcttcttcatataaatgtttaatatacaatataaacaaattctttaccttaagaaggatttcccat 400

 401 tttatattttaaaaatatatttatcaaatatttttcaaccacgtaaatctcataataataagttgtttcaaaagtaataa 480

 481 aatttaactccataatttttttattcgactgatcttaaagcaacacccagtgacacaactagccatttttttctttgaat 560

 561 aaaaaaatccaattatcattgtatttttttttatacaatgaaaatttcaccaaacaatcatttgtggtatttctgaagcaa 640

 641 gtcatgttatgcaaaattctataattcccatttgacactacggaagtaactgaagatctgcttttacatgcgagacacat 720

 721 cttctaaagtaattttaataatagttactatattcaagatttcatatatcaaatactcaatattacttctaaaaaattaa 800

 801 ttagatataattaaaatattacttttttaattttaagtttaattgttgaatttgtgactattgatttattattctactat 880

 881 gtttaaattgttttatagatagtttaaagtaaatataagtaatgtagtagagtgttagagtgttaccctaaaccataaac 960

 961 tataagatttatggtggactaattttcatatatttcttattgcttttacctttttcttggtatgtaagtccgtaactggaa 1040

1041 ttactgtgggttgccatggcactctgtggtcttttggttcatgcatggatgcttgcgcaagaaaaagacaaagaacaaag 1120

1121 aaaaaagacaaaacagagagacaaaacgcaatcacacaaccaactcaaattagtcactggctgatcaagatcgccgcgtc 1200

1201 catgtatgtctaaatgccatgcaaagcaacacgtgcttaacatgcactttaaatggctcacccatctcaacccacacaca 1280

1281 aacacattgccttttcttcatcatcaccacaaccacctgtatatattcattctcttccgccacctcaatttcttcactt 1360

1361 caacacacgtcaacctgcatatgcgtgtcatcccatgcccaaatctccatgcatgttccaaccaccttctctcttatata 1440

1441 atacctataaatacctctaatatcactcacttctttcatcatccatccatccagagtactactactctactactataata 1520

1521 ccccaacccaactcatattcaatactactctact ATG GCG GAT ACA GCT AGA GGA ACC CAT CAC GAT  1587
   1                                    M   A   D   T   A   R   G   T   H   H   D    11

1588 ATC ATC GGC AGA GAC CAG TAC CCG ATG ATG GGC CGA GAC CGA GAC CAG TAC CAG ATG TCC  1647
  12 I   I   G   R   D   Q   Y   P   M   M   G   R   D   R   D   Q   Y   Q   M   S    31

1648 GGA CGA GGA TCT GAC TAC TCC AAG TCT AGG CAG ATT GCT AAA GCT GCA ACT GCT GTC ACA  1707
  32 G   R   G   S   D   Y   S   K   S   R   Q   I   A   K   A   A   T   A   V   T    51

1708 GCT GGT GGT TCC CTC CTT GTT CTC TCC AGC CTT ACC CTT GTT GGA ACT GTC ATA GCT TTG  1767
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FIG. 16

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  52 A   G   G   S   L   L   V   L   S   S   L   T   L   V   G   T   V   I   A   L    71

1768 ACT GTT GCA ACA CCT CTG CTC GTT ATC TTC AGC CCA ATC CTT GTC CCG GCT CTC ATC ACA 1827
  72 T   V   A   T   P   L   L   V   I   F   S   P   I   L   V   P   A   L   I   T    91

1828 GTT GCA CTC CTC ATC ACC GGT TTT CTT TCC TCT GGA GGG TTT GGC ATT GCC GCT ATA ACC 1887
  92 V   A   L   L   I   T   G   F   L   S   S   G   G   F   G   I   A   A   I   T   111

1888 GTT TTC TCT TGG ATT TAC AA gtaagcacacatttatcatcttacttcataattttgtgcaatatgtgcatgca 1960
 112 V   F   S   W   I   Y   K                                                       118

1961 tgtgttgagccagtagctttggatcaatttttttggtcgaataacaaatgtaacaataagaaattgcaaattctagggaa 2040

2041 catttggttaactaaatacgaaatttgacctagctagcttgaatgtgtctgtgtatatcatctatataggtaaaatgctt 2120

2121 ggtatgatacctattgattgtgaatag G TAC GCA ACG GGA GAG CAC CCA CAG GGA TCA GAC AAG    2184
 119                             Y   A   T   G   E   H   P   Q   G   S   D   K      130

2185 TTG GAC AGT GCA AGG ATG AAG TTG GGA AGC AAA GCT CAG GAT CTG AAA GAC AGA GCT CAG 2244
 131 L   D   S   A   R   M   K   L   G   S   K   A   Q   D   L   K   D   R   A   Q   150

2245 TAC TAC GGA CAG CAA CAT ACT GGT GGG GAA CAT GAC CGT GAC CGT ACT CGT GGT GGC CAG 2304
 151 Y   Y   G   Q   Q   H   T   G   G   E   H   D   R   D   R   T   R   G   G   Q   170

2305 CAC ACT ACC ATG AAT GGT CTC GAA ACT CAC AAC ACA AGG CTC TGT ATC GTA GGA AGT GGC 2364
 171 H   T   T   M   N   G   L   E   T   H   N   T   R   L   C   I   V   G   S   G   190

2365 CCA GCG GCA CAC ACG GCG GCG ATT TAC GCA GCT AGG GCT GAA CTT AAA CCT CTT CTC TTC 2424
 191 P   A   A   H   T   A   A   I   Y   A   A   R   A   E   L   K   P   L   L   F   210

2425 GAA GGA TGG ATG GCT AAC GAC ATC GCT CCC GGT GGT CAA CTA ACA ACC ACC ACC GAC GTC 2484
 211 E   G   W   M   A   N   D   I   A   P   G   G   Q   L   T   T   T   T   D   V   230

2485 GAG AAT TTC CCC GGA TTT CCA GAA GGT ATT CTC GGA GTA GAG CTC ACT GAC AAA TTC CGT 2544
 231 E   N   F   P   G   F   P   E   G   I   L   G   V   E   L   T   D   K   F   R   250

2545 AAA CAA TCG GAG CGA TTC GGT ACT ACG ATA TTT ACA GAG ACG GTG ACG AAA GTC GAT TTC 2604
 251 K   Q   S   E   R   F   G   T   T   I   F   T   E   T   V   T   K   V   D   F   270

2605 TCT TCG AAA CCG TTT AAG CTA TTC ACA GAT TCA AAA GCC ATT CTC GCT GAC GCT GTG ATT 2664
 271 S   S   K   P   F   K   L   F   T   D   S   K   A   I   L   A   D   A   V   I   290

2665 CTC GCT ACT GGA GCT GTG GCT AAG CGG CTT AGC TTC GTT GGA TCT GGT GAA GGT TCT GGA 2724
 291 L   A   T   G   A   V   A   K   R   L   S   F   V   G   S   G   E   G   S   G   310

2725 GGT TTC TGG AAC CGT GGA ATC TCC GCT TGT GCT GTT TGC GAC GGA GCT GCT CCG ATA TTC 2784
 311 G   F   W   N   R   G   I   S   A   C   A   V   C   D   G   A   A   P   I   F   330

2785 CGT AAC AAA CCT CTT GCG GTG ATC GGT GGA GGC GAT TCA GCA ATG GAA GAA GCA AAC TTT 2844
 331 R   N   K   P   L   A   V   I   G   G   G   D   S   A   M   E   E   A   N   F   350
```

FIG. 16A

```
2845 CTT ACA AAA TAT GGA TCT AAA GTG TAT ATA ATC CAT AGG AGA GAT GCT TTT AGA GCG TCT 2904
 351 L   T   K   Y   G   S   K   V   Y   I   I   H   R   R   D   A   F   R   A   S   370

2905 AAG ATT ATG CAG CAG CGA GCT TTG TCT AAT CCT AAG ATT GAT GTG ATT TGG AAC TCG TCT 2964
 371 K   I   M   Q   Q   R   A   L   S   N   P   K   I   D   V   I   W   N   S   S   390

2965 GTT GTG GAA GCT TAT GGA GAT GGA GAA AGA GAT GTG CTT GGA GGA TTG AAA GTG AAG AAT 3024
 391 V   V   E   A   Y   G   D   G   E   R   D   V   L   G   G   L   K   V   K   N   410

3025 GTG GTT ACC GGA GAT GTT TCT GAT TTA AAA GTT TCT GGA TTG TTC TTT GCT ATT GGT CAT 3084
 411 V   V   T   G   D   V   S   D   L   K   V   S   G   L   F   F   A   I   G   H   430

3085 GAG CCA GCT ACC AAG TTT TTG GAT GGT GGT GTT GAG TTA GAT TCG GAT GGT TAT GTT GTC 3144
 431 E   P   A   T   K   F   L   D   G   G   V   E   L   D   S   D   G   Y   V   V   450

3145 ACG AAG CCT GGT ACT ACA CAG ACT AGC GTT CCC GGA GTT TTC GCT GCG GGT GAT GTT CAG 3204
 451 T   K   P   G   T   T   Q   T   S   V   P   G   V   F   A   A   G   D   V   Q   470

3205 GAT AAG AAG TAT AGG CAA GCC ATC ACT GCT GCA GGA ACT GGG TGC ATG GCA GCT TTG GAT 3264
 471 D   K   K   Y   R   Q   A   I   T   A   A   G   T   G   C   M   A   A   L   D   490

3265 GCA GAG CAT TAC TTA CAA GAG ATT GGA TCT CAG CAA GGT AAG AGT GAT TGA aqcttaataagt 3327
 491 A   E   H   Y   L   Q   E   I   G   S   Q   Q   G   K   S   D   *  HindIII      507

3328 atgaactaaaatgcatgtaggtgtaagagctcatggagagcatggaatattgtatccgaccatgtaacagtataataact 3407

3408 gagctccatctcacttcttctatgaataaacaaaggatgttatgatatattaacactctatctatgcaccttattgttct 3487

3488 atgataaatttcctcttattattataaatcatctgaatcgtgacggcttatggaatgcttcaaatagtacaaaaacaaat 3567

3568 gtgtactataagactttctaaacaattctaactttagcattgtgaacgagacataagtgttaagaagacataacaattat 3647

3648 aatggaagaagtttgtctccatttatatattatatattacccacttatgtattatattaggatgttaaggagacataaca 3727

3728 attataaagagagaagtttgtatccatttatatattatatactacccatttatatattatacttatccacttatttaatg 3807

3808 tctttataaggtttgatccatgatatttctaatattttagttgatatgtatatgaaagggtactatttgaactctcttac 3887

3888 tctgtataaaggttggatcatccttaaagtgggtctatttaattttattgcttcttacagataaaaaaaaaattatgagt 3967

3968 tggtttgataaaatattgaaggatttaaaataataataaataataaataacatataatatatgtatataaatttattata 4047

4048 atataacatttatctataaaaaagtaaatattgtcataaatctatacaatcgtttagccttgctggacgactctcaatta 4127

4128 tttaaacgagagtaaacatatttgacttttggttatttaacaaattattatttaacactatatgaaatttttttttttt 4207

4208 atcggcaaggaaataaaattaaattaggagggacaatggtgtgtcccaatccttatacaaccaacttccacaggaaggtc 4287
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FIG. 16B

```
4288 aggtcggggacaacaaaaaaacaggcaagggaaatttttaatttgggttgtcttgtttgctgcataatttatgcagtaa 4367

4368 aacactacacataaccctttagcagtagagcaatggttgaccgtgtgcttagcttcttttatttatttttttatcagc 4447

4448 aaagaataaataaaataaaatgagacacttcagggatgtttcaacccttatacaaaaccccaaaaacaagtttcctagca 4527

4528 ccctaccaactaaggtacc                                                            4546
                  KpnI
```

FIG. 16C

PstI
1 ctgcaggaattcattgtactcccagtatcattatagtgaaagttttggctctctcgccggtggtttttacctctattta 80

81 aaggggttttccacctaaaaattctggtatcattctcactttacttgttactttaatttctcataatctttggttgaaat 160

161 tatcacgcttccgcacacgatatccctacaaatttattatttgttaaacattttcaaaccgcataaaattttatgaagtc 240

241 ccgtctatctttaatgtagtctaacattttcatattgaaatataataatttacttaattttagcgttggtagaaagcataa 320

321 tgatttattcttattcttcttcatataaatgtttaatatacaatataaacaaattctttaccttaagaaggatttcccat 400

401 tttatattttaaaaatatatttatcaaatatttttcaaccacgtaaatctcataataataagttgtttcaaaagtaataa 480

481 aatttaactccataatttttttattcgactgatcttaaagcaacacccagtgacacaactagccatttttttctttgaat 560

561 aaaaaaatccaattatcattgtatttttttttatacaatgaaaatttcaccaaacaatcatttgtggtatttctgaagcaa 640

641 gtcatgttatgcaaaattctataattcccatttgacactacggaagtaactgaagatctgcttttacatgcgagacacat 720

721 cttctaaagtaattttaataatagttactatattcaagatttcatatatcaaatactcaatattacttctaaaaaattaa 800

801 ttagatataattaaaatattacttttttaattttaagtttaattgttgaatttgtgactattgatttattattctactat 880

881 gtttaaattgttttatagatagtttaaagtaaatataagtaatgtagtagagtgttagagtgttaccctaaaccataaac 960

961 tataagatttatggtggactaattttcatatatttcttattgcttttacctttcttggtatgtaagtccgtaactggaa 1040

1041 ttactgtgggttgccatggcactctgtggtcttttggttcatgcatggatgcttgcgcaagaaaaagacaaagaacaaag 1120

1121 aaaaaagacaaaacagagagacaaaacgcaatcacacaaccaactcaaattagtcactggctgatcaagatcgccgcgtc 1200

1201 catgtatgtctaaatgccatgcaaagcaacacgtgcttaacatgcactttaaatggctcacccatctcaacccacacaca 1280

1281 aacacattgccttttcttcatcatcaccacaaccacctgtatatattcattctcttccgccacctcaatttcttcactt 1360

1361 caacacacgtcaacctgcatatgcgtgtcatcccatgcccaaatctccatgcatgttccaaccaccttctctcttatata 1440

1441 atacctataaatacctctaatatcactcacttctttcatcatccatccatccagagtactactactctactactataata 1520

1521 ccccaacccaactcatattcaatactactctact ATG AAT GGT CTC GAA ACT CAC AAC ACA AGG CTC 1587
1 M N G L E T H N T R L 11

1588 TGT ATC GTA GGA AGT GGC CCA GCG GCA CAC ACG GCG GCG ATT TAC GCA GCT AGG GCT GAA 1647
12 C I V G S G P A A H T A A I Y A A R A E 31

1648 CTT AAA CCT CTT CTC TTC GAA GGA TGG ATG GCT AAC GAC ATC GCT CCC GGT GGT CAA CTA 1707
32 L K P L L F E G W M A N D I A P G G Q L 51

1708 ACA ACC ACC ACC GAC GTC GAG AAT TTC CCC GGA TTT CCA GAA GGT ATT CTC GGA GTA GAG 1767
52 T T T T D V E N F P G F P E G I L G V E 71

FIG. 17

```
1768 CTC ACT GAC AAA TTC CGT AAA CAA TCG GAG CGA TTC GGT ACT ACG ATA TTT ACA GAG ACG 1827
  72 L   T   D   K   F   R   K   Q   S   E   R   F   G   T   T   I   F   T   E   T   91

1828 GTG ACG AAA GTC GAT TTC TCT TCG AAA CCG TTT AAG CTA TTC ACA GAT TCA AAA GCC ATT 1887
  92 V   T   K   V   D   F   S   S   K   P   F   K   L   F   T   D   S   K   A   I   111

1888 CTC GCT GAC GCT GTG ATT CTC GCT ACT GGA GCT GTG GCT AAG CGG CTT AGC TTC GTT GGA 1947
 112 L   A   D   A   V   I   L   A   T   G   A   V   A   K   R   L   S   F   V   G   131

1948 TCT GGT GAA GGT TCT GGA GGT TTC TGG AAC CGT GGA ATC TCC GCT TGT GCT GTT TGC GAC 2007
 132 S   G   E   G   S   G   G   F   W   N   R   G   I   S   A   C   A   V   C   D   151

2008 GGA GCT GCT CCG ATA TTC CGT AAC AAA CCT CTT GCG GTG ATC GGT GGA GGC GAT TCA GCA 2067
 152 G   A   A   P   I   F   R   N   K   P   L   A   V   I   G   G   G   D   S   A   171

2068 ATG GAA GAA GCA AAC TTT CTT ACA AAA TAT GGA TCT AAA GTG TAT ATA ATC CAT AGG AGA 2127
 172 M   E   E   A   N   F   L   T   K   Y   G   S   K   V   Y   I   I   H   R   R   191

2128 GAT GCT TTT AGA GCG TCT AAG ATT ATG CAG CAG CGA GCT TTG TCT AAT CCT AAG ATT GAT 2187
 192 D   A   F   R   A   S   K   I   M   Q   Q   R   A   L   S   N   P   K   I   D   211

2188 GTG ATT TGG AAC TCG TCT GTT GTG GAA GCT TAT GGA GAT GGA GAA AGA GAT GTG CTT GGA 2247
 212 V   I   W   N   S   S   V   V   E   A   Y   G   D   G   E   R   D   V   L   G   231

2248 GGA TTG AAA GTG AAG AAT GTG GTT ACC GGA GAT GTT TCT GAT TTA AAA GTT TCT GGA TTG 2307
 232 G   L   K   V   K   N   V   V   T   G   D   V   S   D   L   K   V   S   G   L   251

2308 TTC TTT GCT ATT GGT CAT GAG CCA GCT ACC AAG TTT TTG GAT GGT GGT GTT GAG TTA GAT 2367
 252 F   F   A   I   G   H   E   P   A   T   K   F   L   D   G   G   V   E   L   D   271

2368 TCG GAT GGT TAT GTT GTC ACG AAG CCT GGT ACT ACA CAG ACT AGC GTT CCC GGA GTT TTC 2427
 272 S   D   G   Y   V   V   T   K   P   G   T   T   Q   T   S   V   P   G   V   F   291

2428 GCT GCG GGT GAT GTT CAG GAT AAG AAG TAT AGG CAA GCC ATC ACT GCT GCA GGA ACT GGG 2487
 292 A   A   G   D   V   Q   D   K   K   Y   R   Q   A   I   T   A   A   G   T   G   311

2488 TGC ATG GCA GCT TTG GAT GCA GAG CAT TAC TTA CAA GAG ATT GGA TCT CAG CAA GGT AAG 2547
 312 C   M   A   A   L   D   A   E   H   Y   L   Q   E   I   G   S   Q   Q   G   K   331

2548 AGT GAT ATG GCG GAT ACA GCT AGA GGA ACC CAT CAC GAT ATC ATC GGC AGA GAC CAG TAC 2607
 332 S   D   M   A   D   T   A   R   G   T   H   H   D   I   I   G   R   D   Q   Y   351

2608 CCG ATG ATG GGC CGA GAC CGA GAC CAG TAC CAG ATG TCC GGA CGA GGA TCT GAC TAC TCC 2667
 352 P   M   M   G   R   D   R   D   Q   Y   Q   M   S   G   R   G   S   D   Y   S   371

2668 AAG TCT AGG CAG ATT GCT AAA GCT GCA ACT GCT GTC ACA GCT GGT GGT TCC CTC CTT GTT 2727
 372 K   S   R   Q   I   A   K   A   A   T   A   V   T   A   G   G   S   L   L   V   391
```

FIG. 17A

```
2728 CTC TCC AGC CTT ACC CTT GTT GGA ACT GTC ATA GCT TTG ACT GTT GCA ACA CCT CTG CTC  2787
 392 L   S   S   L   T   L   V   G   T   V   I   A   L   T   V   A   T   P   L   L    411

2788 GTT ATC TTC AGC CCA ATC CTT GTC CCG GCT CTC ATC ACA GTT GCA CTC CTC ATC ACC GGT  2847
 412 V   I   F   S   P   I   L   V   P   A   L   I   T   V   A   L   L   I   T   G    431

2848 TTT CTT TCC TCT GGA GGG TTT GGC ATT GCC GCT ATA ACC GTT TTC TCT TGG ATT TAC AA g 2907
 432 F   L   S   S   G   G   F   G   I   A   A   I   T   V   F   S   W   I   Y   K    451

2908 taagcacacatttatcatcttacttcataattttgtgcaatatgtgcatgcatgtgttgagccagtagctttggatcaat 2987

2988 ttttttggtcgaataacaaatgtaacaataagaaattgcaaattctagggaacatttggttaactaaatacgaaatttga 3067

3068 cctagctagcttgaatgtgtctgtgtatatcatctatataggtaaaatgcttggtatgatacctattgattgtgaatag 3146

3147 G TAC GCA ACG GGA GAG CAC CCA CAG GGA TCA GAC AAG TTG GAC AGT GCA AGG ATG AAG    3204
 452   Y   A   T   G   E   H   P   Q   G   S   D   K   L   D   S   A   R   M   K     470

3205 TTG GGA AGC AAA GCT CAG GAT CTG AAA GAC AGA GCT CAG TAC TAC GGA CAG CAA CAT ACT  3264
 471 L   G   S   K   A   Q   D   L   K   D   R   A   Q   Y   Y   G   Q   Q   H   T    490

3265 GGT GGG GAA CAT GAC CGT GAC CGT ACT CGT GGT GGC CAG CAC ACT ACT TAA gcttaataagta 3327
 491 G   G   E   H   D   R   D   R   T   R   G   G   Q   H   T   T   *   HindIII     507
3328 tgaactaaaatgcatgtaggtgtaagagctcatggagagcatggaatattgtatccgaccatgtaacagtataataactg 3407

3408 agctccatctcacttcttctatgaataaacaaaggatgttatgatatattaacactctatctatgcaccttattgttcta 3487

3488 tgataaatttcctcttattattataaatcatctgaatcgtgacggcttatggaatgcttcaaatagtacaaaaacaaatg 3567

3568 tgtactataagactttctaaacaattctaactttagcattgtgaacgagacataagtgttaagaagacataacaattata 3647

3648 atggaagaagtttgtctccatttatatattatatattacccacttatgtattatattaggatgttaaggagacataacaa 3727

3728 ttataaagagagaagtttgtatccatttatatattatatactacccatttatatattatacttatccacttatttaatgt 3807

3808 ctttataaggtttgatccatgatatttctaatattttagttgatatgtatatgaaagggtactatttgaactctcttact 3887

3888 ctgtataaaggttggatcatccttaaagtgggtctatttaattttattgcttcttacagataaaaaaaaaattatgagtt 3967

3968 ggtttgataaaatattgaaggatttaaaataataataaataataaataacatataatatatgtatataaatttattataa 4047

4048 tataacatttatctataaaaaagtaaatattgtcataaatctatacaatcgtttagccttgctggacgactctcaattat 4127

4128 ttaaacgagagtaaacatatttgacttttggttatttaacaaattattatttaacactatatgaaatttttttttttta 4207

4208 tcggcaaggaaataaaattaaattaggagggacaatggtgtgtcccaatccttatacaaccaacttccacaggaaggtca 4287
```

FIG. 17B

```
4288 ggtcggggacaacaaaaaaacaggcaagggaaatttttaatttgggttgtcttgtttgctgcataatttatgcagtaaa 4367

4368 acactacacataacccttttagcagtagagcaatggttgaccgtgtgcttagcttcttttatttttatttttttatcagca 4447

4448 aagaataaataaaataaaatgagacacttcagggatgtttcaacccttatacaaaaccccaaaaacaagtttcctagcac 4527

4528 cctaccaactaaggtacc                                                              4545
                  KpnI
```

FIG. 17C

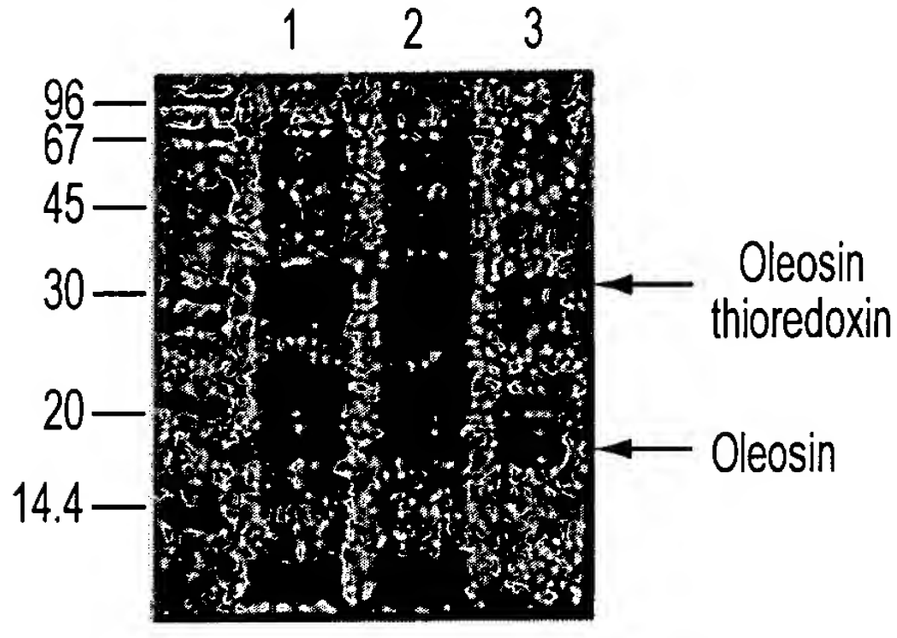

FIG. 18A

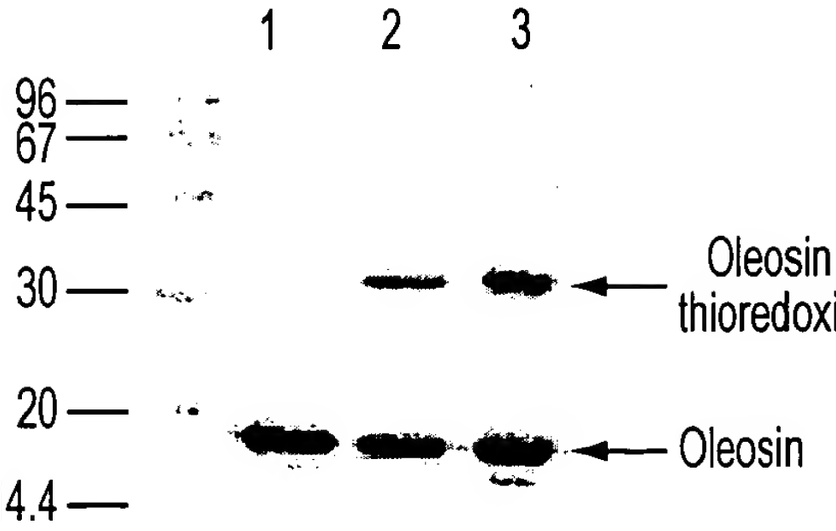

FIG. 18B

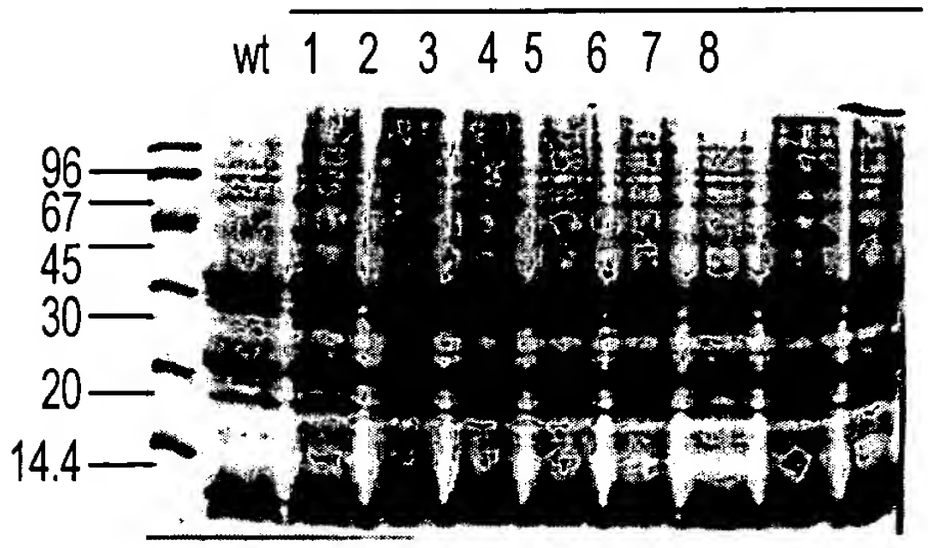

FIG. 19A

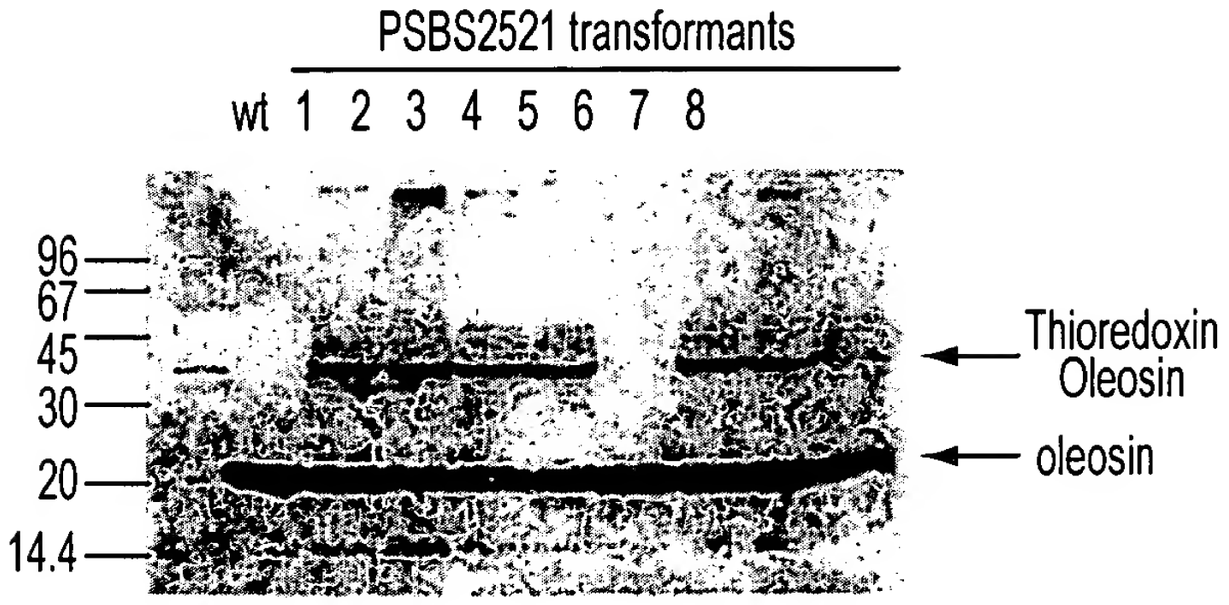

FIG. 19B

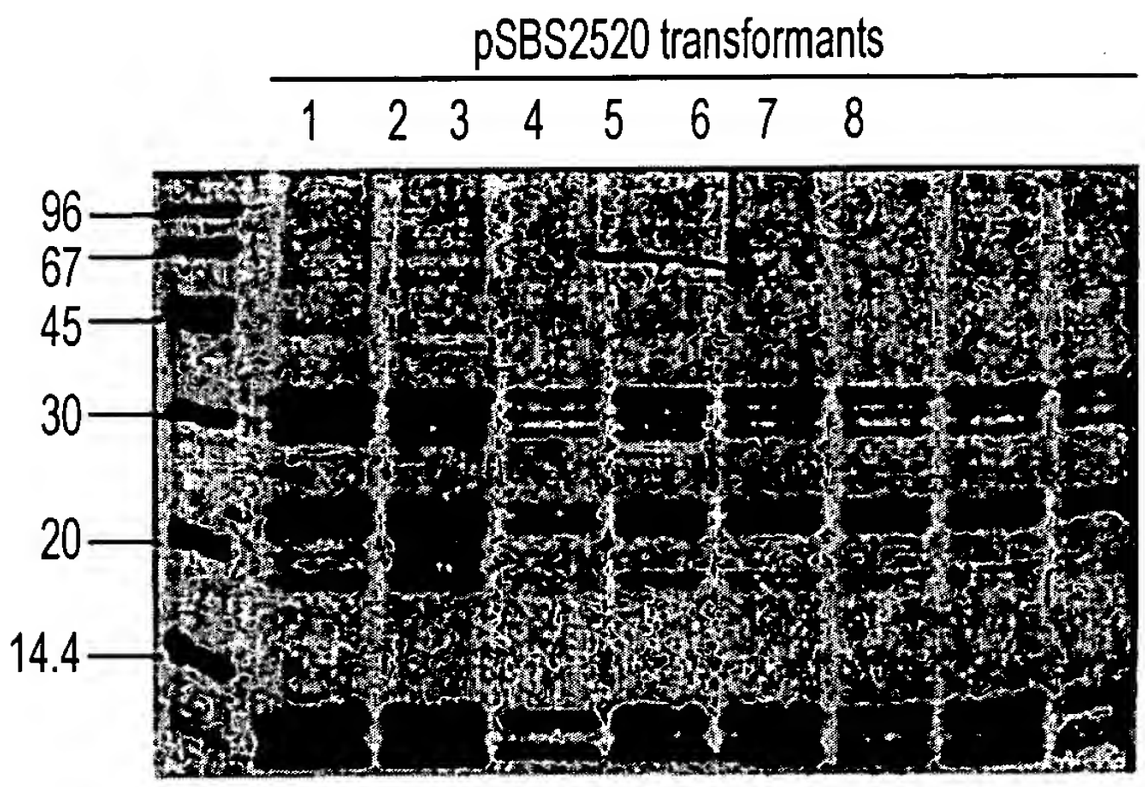

FIG. 20A

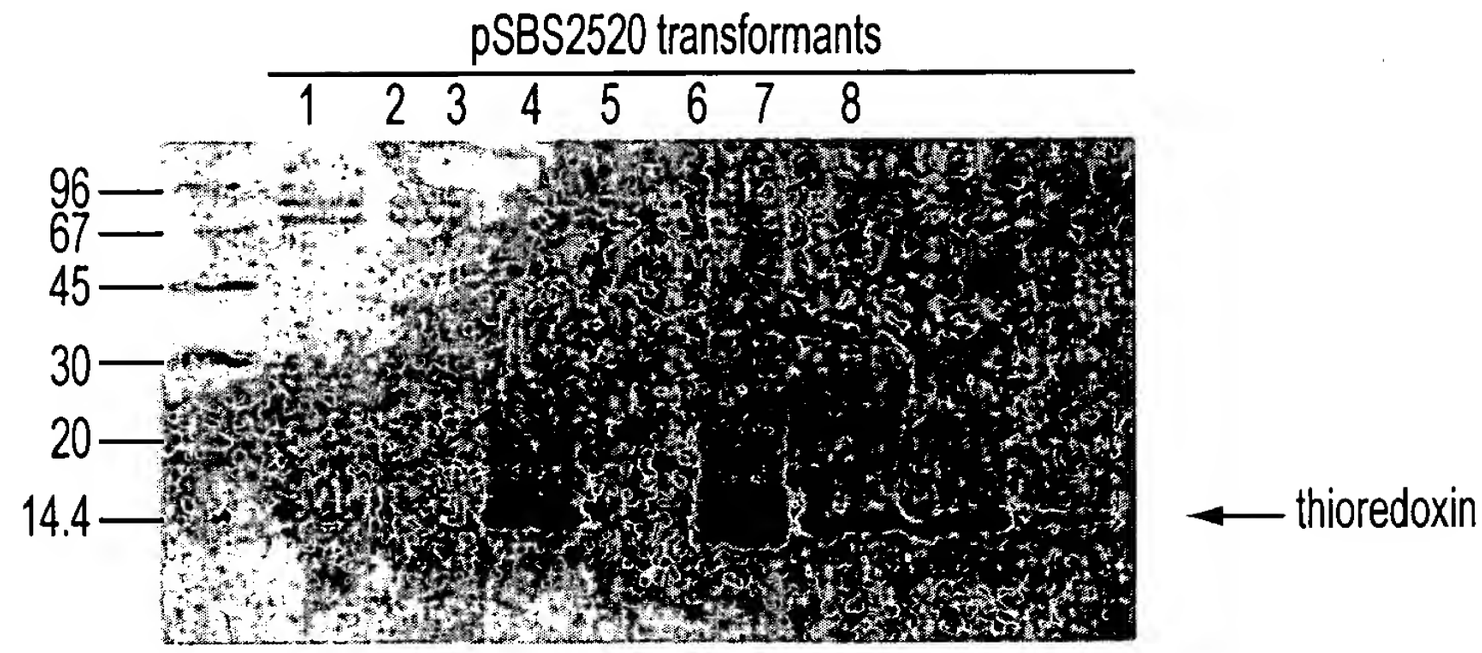

FIG. 20B

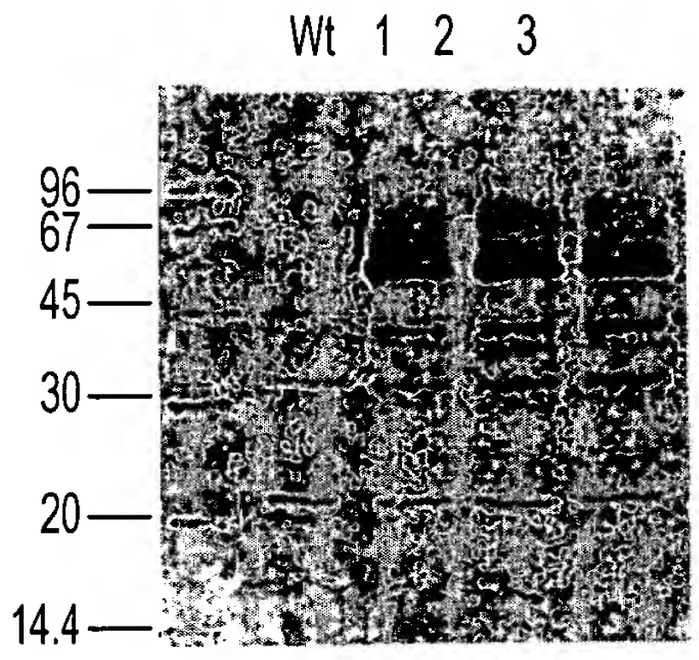

FIG. 21A

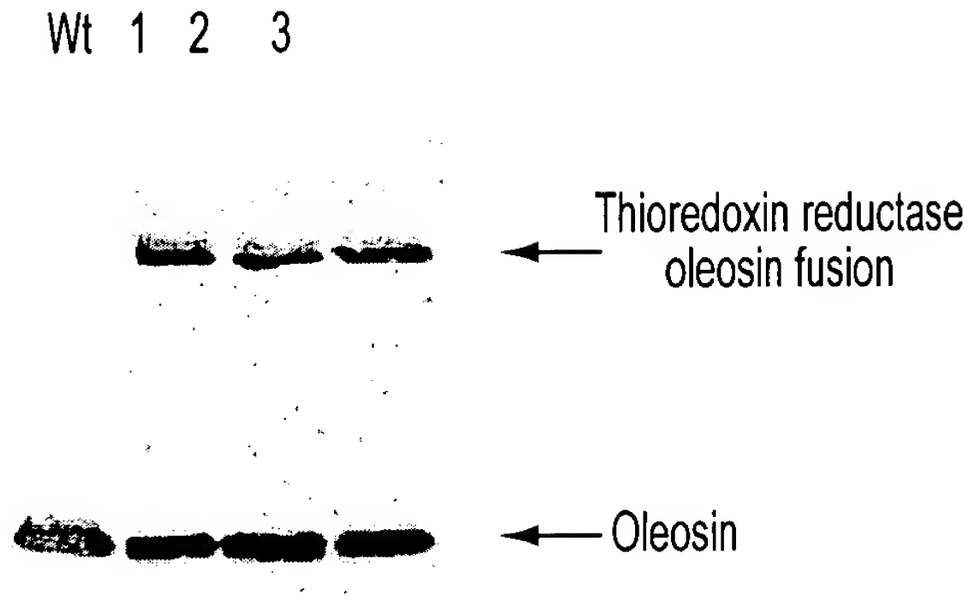

FIG. 21B

Title: PREPARATION OF THIOREDOXIN AND THIOREDOXIN REDUCTASE ON OIL BODIES
Inventor(s): Maurice M. MOLONEY et al.
Appl. No.: 09/897,425

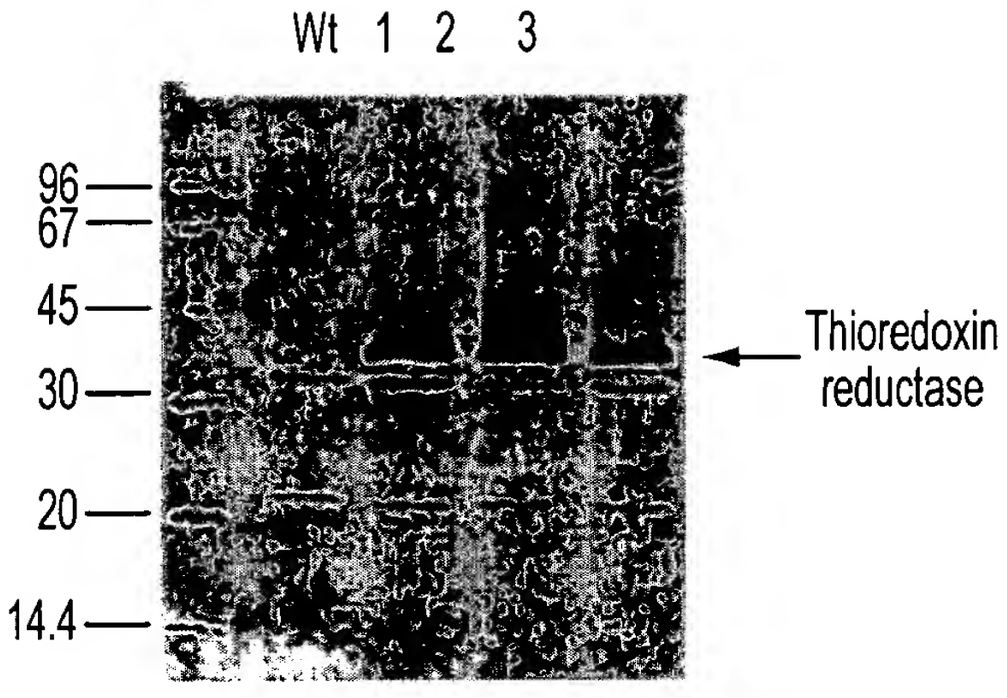

FIG. 22

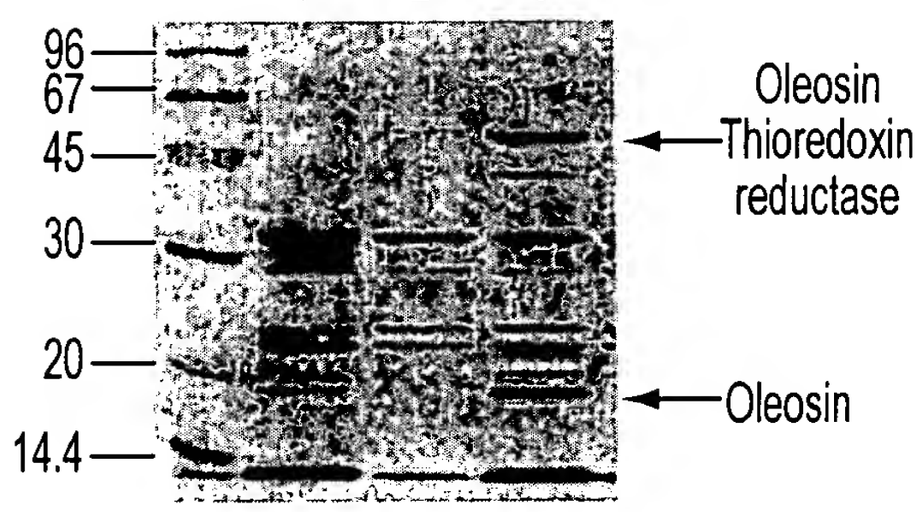

FIG. 23A

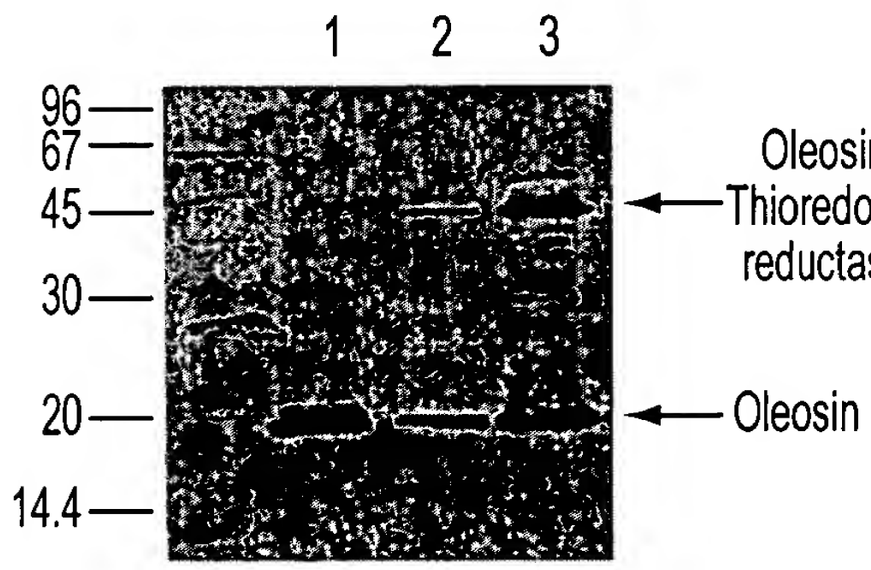

FIG. 23B